H. St. John.

Rhodora

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RHODORA.—A monthly journal of botany, devoted primarily to the flora of the Gray's Manual Range and regions floristically related. Price, $2.00 per year, net, postpaid, in funds payable at par in United States currency in Boston; single copies (if available) of not more than 24 pages and with 1 plate, 20 cents, numbers of more than 24 pages or with more than 1 plate at higher prices (see 3rd cover-page). Volumes 1–8 or some single numbers from them can be supplied only at advanced prices which will be furnished on application; volumes 35–43 can be supplied at $4.00 per volume, net, and some single numbers from them only at advanced prices (see 3rd cover-page). Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be considered for publication to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than two pages of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

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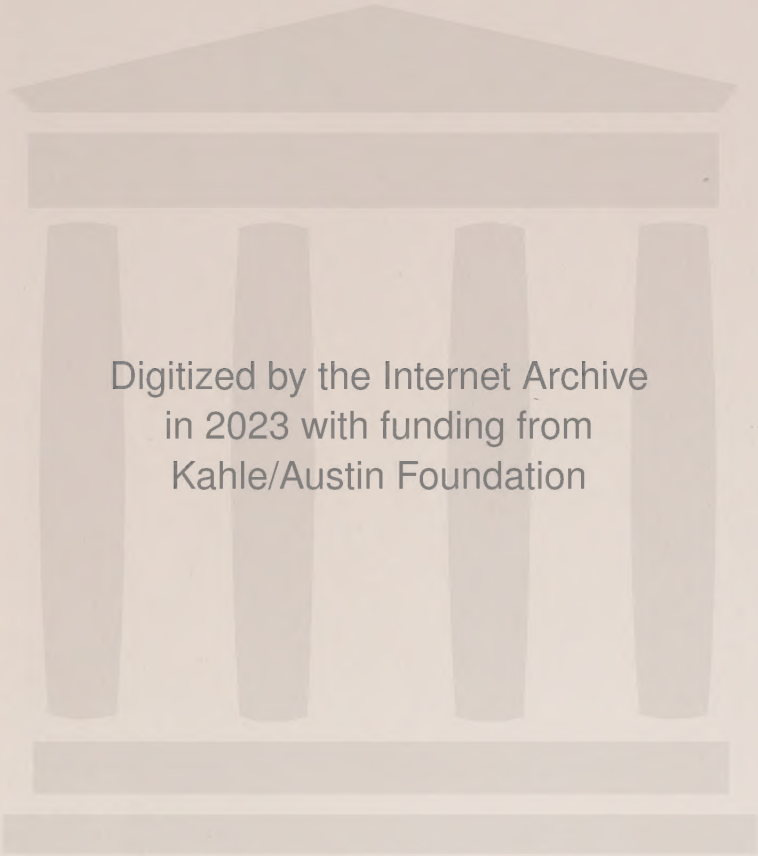

Photo. B. G. Schubert

MUHLENBERGIA FRONDOSA (M. FOLIOSA): FIGS. 1–3, fragments of type of AGROSTIS FOLIOSA, × 5; FIG. 4, spikelets, × 4; FIG. 5, floret, × 10; FIG. 6, grain, × 10.

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ARTHUR HERBERT NORTON

Ralph C. Bean

On January 5, 1943, Arthur Herbert Norton died at his home in Portland, Maine. He had been in failing health since May of the previous year when a critical surgical operation served only to prolong his life for a few months but could not restore him to normal health. He was born on April 19, 1870, on White Head Island in the town of St. George, Maine, the son of Capt. Horace F. Norton, first captain of the Life Saving Station there, and Cynthia Elwell Norton. He attended the St. George schools but received a far broader education on the shores of his native town. Here were unlimited opportunities for study and research on the life of the sea shore, especially of the sea birds. Here he began his observations on birds and their migrations and also began to make collections. In his diary he says: "I wore the covers off a copy of Rev. J. G. Woods' 'Juvenile Natural History'." His father had many good books and read to the children in the evenings, and very often this reading was about Natural History.

In 1885 the family moved to Westbrook, Maine, where Mr. Norton soon found employment in the Haskell silk mill. Here together with his brother he acquired a boat which was kept at the mouth of the Presumpscot River in Falmouth. In his free time he explored Casco Bay and its islands. The observations and studies of these early years laid the foundation for his life work. At this time he decided that he would study Natural History in earnest.

One of his first articles to appear in print was "Nesting of

Contopus borealis at Westbrook, Maine", which appeared in the Oologist in 1890. Through a correspondent he was induced to become an associate of the American Ornithologists' Union. At its meetings he met men who were leaders in the field of bird study. Some of them were particularly interested in his work on the sea birds. As a result of this contact he made an intensive study of the gull colonies of the Maine islands.

In 1898 Mr. Norton decided to give his whole time to his Natural History studies and went to South Carolina equipped to study and photograph birds. He was fairly successful in finding the birds he wished but it was the time of the Spanish American War and his plates were confiscated by the government and his equipment and camera were open to suspicion.

In 1905 Mr. Norton replaced Mr. Charles B. Fuller as Cabinet Keeper of the Natural History Museum at 22 Elm Street, Portland, Maine. Soon after this he moved to Portland where he made his home for the rest of his life. From this time he was identified with the Portland Society of Natural History. He was Curator of the Museum for thirty-seven years.

During his active life he contributed over three hundred articles on various phases of Natural History to scientific publications and for five years he served as editor of the Maine Naturalist. Many of his articles, especially in his earlier years, were written about birds. Such were "Birds of the Bowdoin College Expedition to Labrador" in 1901 and "The Sharptailed Sparrows of Maine" in 1897, published in the Proceedings of the Portland Society of Natural History, and "Birds new or rare in the Fauna of Maine," published in Auk in 1913. In addition there were articles dealing with other animal groups as "The mammals of Portland, Maine, and Vicinity" published in 1930 in the Proceedings of the Portland Society.

Mr. Norton had been working for many years on a "Catalogue of the Birds of Maine". Extensive manuscripts and card files on this project had been accumulated, and this material as well as his extensive library has been presented to the University of Maine. Shortly before his death arrangements had been made with members of the University Faculty to complete this Catalogue.

Mr. Norton's interest in these groups did not diminish as he

grew older but his interest and knowledge of the Flora of Maine increased with the years as his short notes and articles in RHODORA testify. Some of his papers appeared in the Maine Naturalist which was first published in 1920 and of which he became editor in 1926. He contributed much material to the infrequent Bulletins of the Josselyn Botanical Society of Maine. He was president of this organization for the year 1914 and a few years later he was again elected president, an office he held until 1935.

He also served as president of the Cumberland County Audubon Society, and the Maine Audubon Society. He was a charter member of the American Society of Mammalogists and of the Maine Mineralogical and Geological Society. He was also a member of the Portland Society of Natural History, of the Stanton Bird Club of Lewiston and Auburn, Maine, of the American Ornithological Union and of the New England Botanical Club. He was a corresponding member of the Philadelphia Academy of Natural Sciences and of the Cooper Ornithological Club.

Mr. Norton possessed a deep interest in botanical study. His sustained interest in the botany of Maine can be judged by a survey of his notes in RHODORA which began in Volume 4 in 1902 while the last appeared in 1939. Some typical articles are "Plants apparently new to the Maine Catalogue" in 1912, "Some Noteworthy Plants from the Islands and Coast of Maine" in 1913 and "Plants apparently new to Mt. Katahdin" in 1935. While he made trips for observation and collecting to states farther south, his particular field was Maine and there was hardly a section of the State that he had not visited and tramped over. His attendance at the Field Meetings of the Josselyn Botanical Society could always be depended upon. To these meetings he brought his broad background and understanding of the local flora as well as a knowledge of the contributions of others to the flora of that particular region.

My acquaintance with Mr. Norton dates from the Meeting of the Josselyn Botanical Society at Oxford in 1907. There his genuine interest and unselfish helpfulness made the meeting outstanding for the younger members. During the week following the meeting I had the opportunity of being with him in the field

for two memorable days, one along the Presumpscot River near Portland and another in Brunswick where Mr. Norton, Mr. E. B. Chamberlain and myself were the guests of Prof. L. A. Lee of Bowdoin College. The same interest and enthusiasm characterized him in the subsequent meetings that marked him then. The last meeting at which I was with him in the field was the meeting of the Josselyn Botanical Society at Newport in 1941 where he seemed as tireless and eager as in the earlier years.

The lack of extended formal education did not constitute a great handicap to Mr. Norton's chosen career. A recognition of the value of his scientific studies was given him in 1940 when the University of Maine awarded him the degree of Master of Science.

Mr. Norton was modest and retiring by nature and did not like to appear as possessing superior knowledge, but those who came to know him realized that he could answer their questions with authority and accuracy. A marked characteristic was his kindness and patience with amateurs and with anyone who approached him. As a result he was known throughout the State and had an extensive correspondence with men and women in all walks of life. Because of this wide acquaintance many items of scientific interest came to him as well as many specimens for the Portland Society of Natural History. All through the State there are many who feel his passing as a personal loss. Those of us who knew him best realize that the State has lost an excellent botanist and that we have lost a friend whose place cannot be filled.

Wakefield, Massachusetts

Scabiosa Columbaria in Central New York.—Several years ago, Dr. Anne E. Perkins collected *Scabiosa Columbaria* L. in an unmown field along the road between Gowanda and Salamanca in Cattaraugus County, New York. She reported about 150 plants in the field. In the late summer of 1942, Dr. Mildred E. Faust and Miss Nettie M. Sadler found this same species established on the top of the hill just southwest of the falls at Delphi, in Oneida County. They have deposited two collections from this locality in the Cornell University Herbarium, one obtained on September 1 and the other on October 8.

S. Columbaria is native in the Old World. Since it is sometimes cultivated in this country, the occurrences mentioned above may have originated from garden sources. No other North American collections are available in the Cornell University Herbarium, suggesting that this perennial is a very recent addition to our introduced flora.—R. T. Clausen, Department of Botany, Cornell University.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—No. CXLVIII

M. L. Fernald

(Plates 749–769)[1]

During the studies necessary in a thorough revision of the flora of northeastern America and, especially, a checking with photographs of the types of Linnaeus, Michaux and other authors of American species much new matter has accumulated. Some of the studies, with photographs by Dr. Bernice G. Schubert, are here presented.

I. FIVE COMMON RHIZOMATOUS SPECIES OF MUHLENBERGIA

(Plates 749–757)

In eastern North America five species of *Muhlenbergia* stand out as the most common representatives of the rhizomatous members of the genus, the plants passing, mostly erroneously, as *M. mexicana* (L.) Trin., *M. sylvatica* Torr., *M. foliosa* (R. & S.) Trin. and the two very distinct species included under *M. racemosa* (Michx.) BSP. These five species have many technical differences (in glumes, lemmas, anthers, grains, internodes, nodes, sheaths, etc.) and habitally they are distinctive. The names currently applied to them, however, need most careful scrutiny for, when the types (all but one in Europe) are studied, it is apparent that those who have easily recognized the species involved have largely guessed at their names and, too often,

[1] The cost of engraver's blocks has been met in part from an appropriation for original research from the Department of Biology, Harvard University.

have not consulted the original descriptions. Sixteen years ago I undertook a clarification of our species, at that time securing from friends in London, Paris and Berlin photographs of many of the types involved; and in 1930, while in Europe, I checked many points not shown in habit-photographs.

As a result of this study it was evident that we must adopt many unfamiliar names or change the significance of those now familiar but, disliking the upheaval necessitated, I have refrained from publication, with the hope that specialists on the *Gramineae* would take the responsibility of correcting the many errors. Having now reached a stage in my work when the facts can no longer be dodged, I am presenting in key-form the diagnostic characters of the five species. This will be followed by consideration of the names now in use and those which, it seems to me, must be taken up. In some instances, however, inability at present to consult many critical specimens abroad may result in slight future changes. In his Manual Hitchcock[1] adopts for

[1] I am credibly informed that Hitchcock strenuously and rightly objected to these absurd names, which were forced into his book through the ruling of his Chief (see Hitchcock, Man. 14), an illustration of the type of intellectual freedom allowed scholarly and original workers in some branches of our "free and democratic" government. In view of the fact that true and heretofore misinterpreted *Muhlenbergia racemosa*, as stated on one of the labels before me, "Grows in the dryest of soil" one wonders how long the inspired name "Marsh Muhly" will be the "standard" name for it. Its originator obviously intended the name for *M. setosa*, a wholly distinct species of bog, swale, peaty meadows and wet shores. Incidentally, the emended name as "Muley" would be wholly inappropriate for either *M. racemosa* or *M. setosa*, species which differ from the others by the very prolonged awns of their glumes; muley, as every farmer-boy knows, implies lack of horns. The prolific inventor of "English" names flatly discriminated against *M. sylvatica*, *M. "foliosa"* and many others, allowing them no "English" names, although they are thoroughly distinct and abundant species. This was perhaps fortunate, for the binomials generally applied to them are so liable to upset when studied by scientists. If the time used in inventing "English" names for these plants had gone into study of their proper typification some of the upsets in the following pages might be unnecessary. *"C'est à rire!"*

À propos the reference to dictatorship by some in power over young (sometimes older) scientists, I have recently received copies of correspondence from a botanist formerly in government employ, in which the inventor of "English" names ruled that the young man should not publish a new plant in RHODORA because the type is not in the National Herbarium and because the author had followed the International Rules of Plant Nomenclature, though in this case the dictator was overruled by still higher officials. Probably no more severe blight upon scholarly development of taxonomy under federal dictatorship has existed. The inventor of "English" names himself once made a weak effort in taxonomy. That he did not "arrive" is clear from his greatest monograph, with its delightfully naïve key:

Leaves obovate, etc. . . . . .
Leaves not with all the characters given above, etc.
Leaves not exceeding 2 cm. in length, etc.
. . . . . .
. . . . . .

members of *Muhlenbergia* the stupid "English" name "Muhly" ("Marsh Muhly", "Wire-stem Muhly", etc.). There would be some propriety in dropping the *h* and then applying the word as an adjective to the current nomenclature of the misinterpreted five. In tabulating the characters I am numbering the species, the name in current use being bracketed. Beautifully clear illustrations of four of the plants will be found in Hitchcock's Manual, figs. 768, 770, 774 and 776. I am greatly indebted to Mr. Jason Swallen for an opportunity to study fragments of the types of *Agrostis mexicana* L. and of *A. foliosa* R. & S. Photographs made from them will be found in PLATES 749, FIGS. 1–3 and 751, FIG. 2).

a. Rhizomes and stolons 2–6 mm. thick, with cucullate-arching ovate scales; nodes of culm thick and abruptly enlarged; panicles usually arching, their branches evident; glumes shorter than to about equaling lemma, the longer 2–3.5 mm. long; base of lemma with straight and rather stiff beard; anthers 0.3–0.6 mm. long . . . *b.*

b. Culms loosely ascending to geniculate and rooting at lower nodes, freely branching from basal and middle nodes, the branches soon forking, the plants thus becoming bushy in habit and topheavy, the promptly uncovered internodes lustrous and glabrous; leaf-sheaths loose, laterally compressed, promptly opening to base; terminal panicle exserted, or with included base, at first lax and open, lanceolate to slenderly pyramidal or ellipsoid, later with appressed branches; lateral panicles in axils of many leaves, partly included; many spikelets slender-pedicelled; glumes very unequal, both awned, membranaceous, green or purplish; lemma membranous; grain easily loosened, linear-cylindric, 1.6–2 mm. long . . . . . 1. [*M. mexicana*].

b. Culms erect or ascending, lower nodes not rooting, unbranched or with erect or ascending mostly simple branches from middle nodes, internodes largely covered by sheaths, opaque and puberulent; leaf-sheaths tight, terete, tardily opening to base; panicles all or nearly all terminating culms and erect branches, mostly exserted, linear- to oblong-cylindric; glumes subulate-tipped (if rarely awned, subequal).

Erect, with few simple appressed-ascending branches; leaf-blades ascending or slightly spreading, firm; panicles rather stiff, the subsessile to short-pedicelled spikelets densely imbricated and extending to bases of the glomerulate appressed-ascending branches and branchlets; glumes subequal, firm and herbaceous, usually green or

---

Leaves not with all the characters given above.
Leaves orbicular to oval, etc.
Leaves or other parts not as described above.

and so on, including the informative calls in the key "Leaves not as described". It is no wonder that one who got little deeper than that into an exacting field did not fully understand its importance.

purplish; lemma firm, usually awnless (rarely awned); mature florets persistent; grain slenderly ellipsoid, 1.3–1.6 mm. long, tightly embraced by lemma and palea. 2. [*M. foliosa*].

Ascending to erect, with many ascending simple or forking branches from middle nodes; leaf-blades spreading, rather soft and pliant; panicles slender, loosely flowered, flexuous, the longer branches mostly without crowded basal spikelets, the spikelets often long-pedicelled; glumes very unequal, scarious or hyaline, usually whitish or silvery; lemma scarious, silvery, often long-awned; mature florets promptly dropping; grain linear-cylindric, 1.4–2.1 mm. long, easily removed.....3. [*M. sylvatica*].

a. Rhizomes and stolons slender (2–4 mm. thick), greatly prolonged and forking, with appressed lanceolate to narrowly oblong prolonged scales; nodes of culm gradually enlarged upward; panicles all at tips of culms or branches, stiff, lobulate-spiciform (especially at summit) the stiff branches densely flowered to base; glumes much exceeding lemma, subequal, linear-attenuate and long-awned, 4.5–8 mm. long; lemma slenderly villous at base; anthers 0.5–1.5 mm. long; ripe florets tardily dropping.

Culms mostly branching from middle nodes, the leaves and branches there approximate, the internodes lustrous and glabrous; leaf-sheath acutely keeled, the prolonged ligule 3–5 mm. long; anthers 0.5–0.8 mm. long; grain tightly embraced, linear-cylindric, 1.8–2.2 mm. long; species of dry prairie, rocks and bluffs from Wisconsin to Saskatchewan, and west to Oregon, south to Illinois, Missouri, Kansas and New Mexico; casual along railroads eastward 4. [*M. racemosa*].

Culms simple or with few erect basal branches; the internodes opaque and puberulent; leaf-sheath with rounded midrib, scarcely keeled, the inconspicuous ligule 0.5–1.5 mm. long; anthers 1–1.5 mm. long; grain easily freed, oblong-cylindric, 1.2–1.5 mm. long; species of bogs, wet meadows, wet rocks and shores, from Newfoundland to Alberta, south to North Carolina, Indiana, Wisconsin, Minnesota, Wyoming, Nevada and Oregon.....5. [*M. racemosa*].

True M. mexicana (Plates 751 and 752)

Muhlenbergia mexicana (L.) Trin. Gram. Unifl. 189 (1824) rests upon *Agrostis mexicana* L. Mant. i. 31 (1767). *Agrostis mexicana* was raised by Linnaeus in the garden at Upsala from seeds sent him from Vienna by Jacquin and erroneously thought to have come from tropical America. By most recent authors it is considered to be species no. 1 of the preceding key: "the plants becoming topheavy and bushy", to use Hitchcock's phrase, with abundant decumbent and rooting or ascending often forking lustrous branches; the sheaths compressed and loose, promptly opening to the base; the branches bearing numerous partly included axillary panicles; the terminal panicles relatively

soft and loose upon expanding, many of the spikelets long-pedicelled; the glumes very unequal and both awned; the easily removed grain linear-cylindric, etc. How different was the unusually full description by Linneaus of his *Agrostis mexicana:*

mexicana. 20. AGROSTIS panicula oblonga congesta, calycibus [glumis] corollisque [lemmatibusque] acuminatis subaequalibus muticis. *Habitat in* America *calidiore. D. Jacquin* .♂
Culmi *numerosi, pedales, laeues, erecti.* Ramis *indiuisis.* Folia *laeuiuscula ligula truncata.* Panicula *viridis, oblonga, non patens, sed congesta coaceruatis numerosissimis viridibus floribus.* Flores *scabri.* Calyces *apice subulati, subaequales, parum scabri.* Corollae *longitudine calycis, apice similiter acuminatae, basi pilosae.* Aristae *nullae.* Stigmata *atropurpurea, ramosa.* Stamina *alba. Difficillime hoc Gramen determinatur. Altero anno floret. Facies Cinnae.* H. U.

Passing for the moment the "*panicula oblonga congesta*" or "*congesta coaceruatis*", it should be clear that the "culmi . . . *erecti*" the "Ramis *indiuisis*" and the "Calyces [glumae] *apice subulati, subaequales*" do not belong to species no. 1, which has often decumbent or lopping culms with mostly forking and very abundant basal and median branches, the glumes very unequal and both slenderly awned. The "Aristae *nullae*" could belong to no. 1 or to no. 2. Linnaeus said nothing about the very numerous axillary panicles partly included in the subinflated sheaths of the branches which so generally characterize no. 1. His unusually full description is clearly not a good one for no. 1 and, in view of the almost universal recent error of so identifying it, the original comment of Linnaeus still has force: "*Difficillime hoc Gramen determinatur*". Linnaeus had two sheets of the type material, both clearly marked by him *Agrostis mexicana.* Beautiful photographs of the two sheets, sent to the Gray Herbarium in 1927 by the late Dr. B. Daydon Jackson, are before me. One is of a badly crumpled specimen, the other (our PLATE 751, FIG. 1) better prepared. They both show erect culms, with few simple erect branches, tight sheaths, terminal panicles, no definitely included axillary panicles, subequal awnless glumes (PLATE 751, FIG. 3) and awnless lemmas; and the broken-off culms are 5 dm. (20 inches) high. Linnaeus's "culmi . . . *pedales*" was too conservative. PLATE 752, FIG. 2 is from a portion of the panicle of the type, now preserved at the United States National Herbar-

ium and most generously sent me for study by Mr. Swallen. The type specimens of *Agrostis mexicana* are of species no. 2, the plant passing as *Muhlenbergia foliosa*.

As he stated, Linnaeus received his seed from Jacquin and raised the plant at Upsala. Jacquin's plant at Vienna was clearly described, and illustrated by a life-size colored plate, by the younger Jacquin in his Eclogae Plantarum Rariorum—Gram. Fasc. ter. et quart., 44, t. 30 (1813). Jacquin filius departed little from Linnaeus, his fuller account including "Culmi . . . bipedales, . . . erecti, . . . teretes . . . ; ramis axillaribus, erectis, distichis, adpressis . . . vaginis . . . apertis . . . Flores in paniculis terminalibus culmi primarii et ramorum, ante et post anthesin coarctatis, . . . ; ramis ramulisque . . . erectis adpressis . . . Calyx . . . Glumae subaequales, lanceolatae, acuminatae"; and his wonderful plate (our plate 752) showed a characteristic plant of our species no. 2, even to the slenderly ellipsoid grain. The material cultivated by the Jacquins at Vienna was, then, like that sent to and cultivated by Linnaeus at Upsala and described by him as *Agrostis mexicana*. When he transferred *A. mexicana* to *Muhlenbergia*, Trinius, Gram. Unifl. 189 (1824) held the diagnostic characters of the Linnean species "Panicula contracta densiuscula; Glumis lineari-lanceolatis acutissimis subaequalibus perianthio acutissimo vix brevioribus". There seems to be no way to avoid taking up for the plant erroneously passing as *M. foliosa* the clearly described and typified M. mexicana (L.) Trin.

M. mexicana of recent Authors (Plates 749 and 750)

When we consider the earlier available names for the plant recently but erroneously passing as *Muhlenbergia mexicana*, our species no. 1, the name seemingly available, if we accept current bibliographies, is *M. lateriflora* (Michx.) Trin. ex Kunth, Enum. i. 207 (1833) in synonymy of *Cinna lateriflora* Kunth, Rev. Gram. i. 67 (1829), both names based on *Agrostis lateriflora* Michx. Fl. Bor.-Am. i. 53 (1803) from rock-cliffs of the Mississippi and shores in [southern] Illinois. Michaux's description is not at all good for a plant with geniculate and bushy-branched stems, relatively large terminal panicles and long-awned glumes;

Photo. B. G. Schubert.

MUHLENBERGIA FRONDOSA: FIG. 1, characteristic decumbent branch, × 1⅓; FIG. 2, characteristic glabrous internode, open and compressed sheath and partly included panicle, × 5; FIG. 3, portion of rhizome, × 4.

Photo. B. G. Schubert.

MUHLENBERGIA MEXICANA: FIG. 1, type of AGROSTIS MEXICANA, × ½; FIG. 2, portion of panicle of type, × 5; FIG. 3, spikelets, × 10.

and the photograph of the type sent me by M. Cintract is very inconclusive. The description was as follows:

LATERIFLORA. A. culmis erectis, nodosis: foliis linearibus, planis: paniculis lateralibus et terminalibus, pusillis, coarctatis, densifloris: glumae muticae et scaberulae valvis acutissimis; interioribus majoribus, basi barbulatis.

Hab. praesertim in praecipitibus saxosis fluminis *Mississipi* et ripariis Illinoensibus.

Authors immediately following Michaux seem not to have known the plant, Beauvois shifting it without discussion to *Vilfa*, and Kunth, likewise with no discussion, transferring it to *Cinna*. It was not until Kunth's Enumeratio that the plant, as *Cinna lateriflora* (Michx.) Kunth, with "Muehlenbergia lateriflora *Trin.*" as a synonym, was again accorded a diagnosis, that copied directly from Michaux. Michaux's erect culm, densely flowered small panicles and muticous glumes are not satisfactory for the common plant known as *M. mexicana*. The photograph is of mere fragments: broken-off tips of a stiffly ascending plant with long internodes; leaf-blades erect, only 2–4 mm. broad and long-tapering; the linear-filiform panicles only 1.5–4 mm. thick, with spikelets only 2.5–3 mm. long. These fragments look like small bits picked from a plant of *M. glabriflora* Scribn. Only Michaux's "glumae . . . interioribus . . . basi barbulatis" would seem to separate it from that species of dry or baked soils, gravels or rocky slopes, from southwestern Indiana (perhaps also Ohio) and Illinois to Texas. *M. glabriflora* is reputed to have the lemma glabrous. It would not now be justifiable to reduce *M. glabriflora* to *M. lateriflora;* when the florets can be actually studied that may be inevitable. In fact, Steudel, Synop. Pl. Gram. 182 (1854), describing in detail the species he took to be *Cinna lateriflora* (Michx.) Kunth, from Ohio plants of Frank's, said "glumis . . . subaequalibus . . . ; valvulis . . . glabris." It is, however, fairly clear that we can not properly take up *M. lateriflora* for the plant, no. 1, which has been passing as *M. mexicana*.

Another name, ignored or waved aside by recent American authors, needs consideration, for it is with little doubt the first name for species no. 1, the plant generally passing as *Muhlenbergia mexicana* and so passing for more than a century, the confusion dating back to botanists of a full century ago, when

nos. 1 and 2 were completely mixed in our floras, Torrey, Fl. N. Y. ii. 437, 438 (1843), for instance, saying "*M. foliosa* Trin. (*Agrostis filiformis*, Muhl. gram.) seems to be only a variety of this species", in which, unintentionally perhaps, he was correct, for, as I later show, the type of *Agrostis filiformis* is the form of true *M. mexicana* with awned lemmas. The species (*M. mexicana* sensu Torrey) with "Culm . . . much branched . . . often geniculate; sheaths compressed, loose . . . is sometimes troublesome in gardens", the latter points applying to species no. 1. The neglected name to which I refer is *Agrostis frondosa* Poir. in Lam. Encyc. Suppl. i. 252 (1790). The description, noting *flexuous stems, very leafy and compressed branches*, purplish nodes, *loose sheaths* and oblong and often purplish panicles suggesting those of *A. mexicana*, are all indicative of species no. 1. Here is Poiret's account, he giving the name because of the leafiness of the plant:

46. Agrostis feuillé *Agrostis frondosa.*

Agrostis culmo flexuoso, articulis ramosis, foliosis; paniculis coarctatis; calicibus acutis, corollâ brevioribus. (N.)

Ses tiges sont hautes d'un à deux pieds, glabres, un peu flexueuses à leurs articulations: de chacune de ces articulations il sort des rameaux feuillés, comprimés, également flexueux, & souvent de couleur purpurine au dessous des noeuds. Les feuilles sont glabres, courtes, nombreuses; leur gaîne lâche, nue à son orifice, munie d'une petite membrane blanche. Les panicules sont étroites, serrées, assez semblables à celles de l'*agrostis mexicana;* les ramifications en forme d'épis oblongs, de couleur verte, un peu purpurine; les fleurs petites, oblongues; les valves calicinales plus courtes que celles de la corolle, aiguës, mucronées à leur sommet; celles de la corolle étroites, oblongues, aiguës.

Cette plante croît en Allemagne. (*V. s. in herb. Desfont.*)

Although it was supposed that *Agrostis frondosa* came from Germany, the name was completely disregarded in the great German floras of Gmelin, Koch and others of their period; nor does it have any recognition in the more modern and voluminous treatments by Ascherson & Graebner and by Hegi. The source, like that of so many species early reaching European collections, was evidently misunderstood, as was that of *A. mexicana* of Linnaeus, Jacquin and others. Nevertheless, the weedy tendency of species no. 1 evidently enabled it to reach Europe somewhat after Poiret's time. For instance, Lejeune & Courtois, Comp. Fl. Belg. i. 61 (1828) refer to *A. "mexicana"* having been collected in Belgium, "e semine exotico orta"; and Hegi, Ill. Fl.

Mittel-Eur. vii. 154 (1931), refers to the recent occurrence in Germany of *M. "mexicana."* Whether these are true *M. mexicana* (*"foliosa"*) or the very different plant (our no. 1) which generally passes as *M. mexicana* I can not now determine.

But, returning to *Agrostis frondosa* Poir. Roemer & Schultes, Syst. ii. 373 (1817) made it an exact synonym of their newly defined *A. foliosa*, saying "certissime huc spectat". Steudel, who certainly understood grasses, treated it unequivocally in his Nomenclator, ed. 2: 365 (1840) as identical with various plants now placed under *Muhlenbergia* (including *M. foliosa*, etc., but not *M. mexicana*, which Steudel retained in the true sense). Hooker filius & Jackson in Index Kewensis, placed it, also without question, in the all-inclusive *M. mexicana* of their period. As already noted, Poiret's "culmo flexuoso . . . de chacune de ces articulations il sort des rameux feuillés, comprimés, également flexueux . . . Les feuilles . . . nombreuses; leur gaîne lâche, . . . Les panicules . . . les ramifications en forme d'épis oblongs" are reasonably good characterizations of our common so-called *M. mexicana;* no other species involved in the problem has *lax* and *compressed* sheaths. I am, therefore, subject to verification when the type can be studied, identifying *M. mexicana* of recent authors with AGROSTIS FRONDOSA Poiret.

The name *Muhlenbergia foliosa* (Roemer & Schultes) Trin. Gram. Unifl. 196 (1824) rests for typification upon *Agrostis foliosa* Roem. & Schultes, Syst. Veg. ii. 373 (1817). As currently treated *M. foliosa* is an erect plant with few erect branches; scabrous-puberulent internodes; firm ascending leaves; "panicles mostly exserted, often rather long-exserted, narrow, of numerous short appressed densely flowered somewhat aggregate branches" (*Hitchcock*), the branches densely flowered to base; the spikelets subsessile or short-pedicelled; glumes subequal and subulate-tipped (only rarely definitely awned), firm and herbaceous; the usually awnless lemma of similar texture; the mature florets tardily dropping and tightly embracing the slenderly ellipsoid grain (1.3–1.6 mm. long), the plant, my no. 2, which I identify with *M. mexicana* in the strict sense. Roemer & Schultes evidently supposed that Poiret's *Agrostis frondosa* was the plant in cultivation under the equivalent name, *A. foliosa*, and their glumes unequal, with hispid awns ("calycibus inaequalibus aris-

tatis hispidis") might well have been derived from *A. frondosa;* but their lemma and palea unequal, the former awned at tip and the culm much branched, erect ("corollis . . . inaequalibus valvulâ majore apice aristata, culmo ramosissimo erecto") suggest *M. sylvatica!* Roemer & Schultes had two varieties: "α. paniculis viridibus" to which they assigned *A. filiformis* Willd.; and "β. paniculis rubicundis" to which they assigned *A. frondosa* Poir. The latter has already been discussed.

The two subdivisions of their *Agrostis foliosa* were borrowed in part from Willdenow, who had described, also from cultivated plants, *A. filiformis* Willd. Hort. Bot. Berol. i. 95 (1809); but without including in it *A. frondosa* Poir.

*6. AGROSTIS *filiformis.*
A. panicula coarctata subspicata, calycibus aristatis inaequalibus hispidis, corollis calyce majoribus inaequalibus valvula majore apice aristata, culmo ramosissimo erecto.
α. paniculis viridibus.
β. paniculis rubicundis.
Agrostis foliosa *Hortulanorum.*
Habitat in America *boreali.* ♃. D.
A Polypogone diversa calycibus corolla brevioribus. Habitu accedit ad A. mexicanam, sed calycibus, corollis, inflorescentia tenuiore, et florescentia serotina diversa. Varietas β robustior.

A photograph of Willdenow's type of *Agrostis filiformis,* most kindly presented to me by Professor Diels, shows the slenderest extreme of *Muhlenbergia mexicana,* the plant usually passing as *A. foliosa;* but the awns at the tips of the lemmas show that it is the form known as *A. foliosa,* forma *ambigua* (Torr.) Wieg. The exact identity of the plants of Roemer & Schultes must await opportunity to study them. In the mean time, however, the very liberal fragments of what was taken as the type of Roemer & Schultes have been sent me from the National Herbarium at Washington for study. Portions of this material are reproduced as PLATE 749, FIGS. 1, 2 and 3. They certainly belong to the species which has erroneously passed as *M. mexicana;* and since the name *Agrostis foliosa* Roemer & Schultes was nomenclaturally a substitute for *A. frondosa* Poir. and, therefore, illegitimate, it is fortunate that the Roemer & Schultes type belongs so unequivocally to the species which I take to be *A. frondosa* of Poiret.

Photo. B. G. Schubert.

MUHLENBERGIA MEXICANA: FIG. 1, Jacquin's plate of AGROSTIS MEXICANA, × 2/5; FIG. 2, summit of puberulent and opaque internode and node and base of sheath, × 5, from Massachusetts; FIG. 3, floret, × 10, from Quebec; FIG. 4, grain, × 10, from New Jersey.

Photo. B. G. Schubert

Muhlenbergia racemosa: fig. 1 (2 branches), type of *Agrostis racemosa*, × ½; fig. 2, panicle, × 1, from Illinois; fig. 3, panicle, × 1, from Illinois; fig. 4, spikelet, × 10, from Minnesota; fig. 5, floret, × 10, from Minnesota; fig. 6, grain, × 10, from Illinois.

M. sylvatica

Muhlenbergia sylvatica Torr. is, apparently, correctly understood! A northeastern variety of it will be published on a succeeding page.

M. racemosa (Plates 753 and 754)

Muhlenbergia racemosa (Michx.) BSP., on the other hand, has been quite misinterpreted. This misinterpretation arose through the fact that most specimens reaching the European herbaria and the plant best known to botanists of Cambridge, New York and Washington is the very different *M. setosa* (Spreng.) Trin., with erect, slender and usually simple culms with scabrous-puberulent internodes, typical of bogs, wet meadows and shores and doubtless suggesting to the manufacturer of "English" names the pseudonym "Marsh Muhly", commented upon on p. 222. *Agrostis racemosa* Michx., basis of the very recent and by its authors not understood combination *M. racemosa* (Michx.) BSP. Prelim. Cat. N. Y. 67 (1888), "Presumably based on *Agrostis racemosa* Michx." (*Hitchcock*), is a wholly different species of the interior of the continent and almost unknown in herbaria prior to 1850. It was finally recognized as *M. glomerata*, var. *ramosa* Vasey, Descr. Cat. Grasses U. S. 40 (1886) but Vasey did not see the really distinctive characters.

Muhlenbergia setosa (or *glomerata*) has the culms unbranched or with few erect basal branches; opaque and scabrous-puberulent internodes; leaf-sheath with rounded midrib and minute usually hidden ligule; conspicuous anthers 1–1.5 mm. long; oblong-cylindric grain easily freed and 1.2–1.5 mm. long; the species with transcontinental boreal range and intrusions southward, east and west, in paludal habitats. *M. racemosa*, on the other hand, is a plant of the dry interior, often "in the dryest of soil", with culms usually stiffly branched at the middle nodes; the internodes lustrous and glabrous; the leaf-sheath keeled; the ligule prolonged; the anthers only 0.5–0.8 mm. long; the tightly embraced linear-cylindric grain 1.8–2.2 mm. long.

Michaux's original description was too general to note any of the specific points, and his habitat, "in ripis sabulosis inundatis fluminis *Mississipi*" inconclusive. The photograph of the type before me shows, however, the high-branching culm and the

characteristic stiffly glomerulate-spiciform panicles of *M. glomerata*, var. *ramosa;* and examination by me of the Michaux specimens in 1930 revealed the glabrous internodes and tiny anthers. The name *Muhlenbergia racemosa* (Michx.) BSP. should be restricted to the plant of the interior later described as *M. glomerata*, var. *ramosa*.

M. setosa (Plates 755–757)

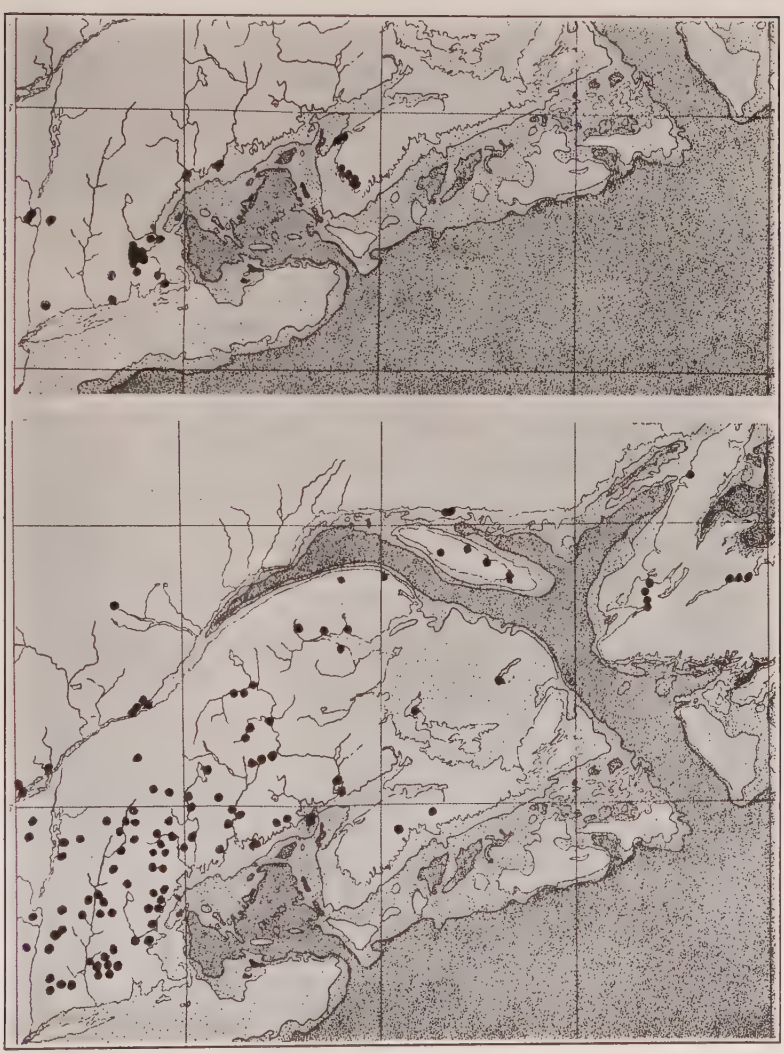
Muhlenbergia glomerata (Willd.) Trin. Gram. Unifl. 191, pl. 5, fig. 10 (1824) rests upon *Polypogon glomeratus* Willd. Enum. Pl. 87 (1809), which was described in great detail, the simple diagnosis and accompanying statements being

*2. POLYPOGON *glomeratus*.
P. panicula glomerata subspicata, calycibus subulatis scabris, culmo adscendente basi ramoso.
Agrostis festucoides *Mühlenberg in litt.*
Habitat in America *boreali* 2|. D.

Since the plant was received from Muhlenberg, it presumably came from eastern Pennsylvania. The very long description following the diagnosis may be abbreviated.

"*Folia* rigidiuscula . . . *Ligula* brevissima . . . *Vaginae* foliorum solutae. *Panicula* glomerato-spicata obtusiuscula, ramis brevissimis adpressis flexuosis . . . *Calyx* . . . aristatus corolla longior, nervo medio viridi, una cum arista scabro . . . Basis corollae pilis aliquot est instructa . . . Habitu accedit quodammodo ad Agrostidem mexicanam, sed recedit ab hoc genere calyce aristato, et est vera Polypogonis species."

The type, for a photograph (our plate 756, fig. 1) of which I am indebted to Professor Diels, consists of four plants of the characteristic species (map 1) growing in bogs and wet meadows from western Nova Scotia and southern Maine to southern Ontario and Michigan, south to southern New England, northern New Jersey, Pennsylvania, mountains to North Carolina, and Indiana. There is no question about the identity of *Muhlenbergia glomerata;* but a second plant (map 2), also of simple habit or branched usually from the base, with puberulent internodes, large anthers and short grains, occurs farther north, from Newfoundland to Alberta, south to Nova Scotia and Maine, northern Massachusetts, Connecticut, New York, central Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, Wyoming, Nevada and Oregon. This is *Dactylogramma cinnoides* Link, Hort. Berol. ii.



Map 1 (upper), eastern Range of Muhlenbergia setosa; map 2 (lower), of M. setosa, var. cinnoides.

248 (1833), described in great detail from plants raised from seed from northwestern Canada sent by Dr. John Richardson. The genus *Dactylogramma* Link was based on this material, Link separating it from *Cinna*. From the very full description the following points are drawn:

"Caulis erectus parum ramosus . . . Panicula tenuis glomerata. Valvae subaequales longissime acutatae quasi aristatae, glumella longiores. Valvulae . . . pilis longis adpressis ad marginem . . . Caulis sub terra repens, 2–3 pedes altus . . . inferne pilis brevissimis pubescens . . . ligula brevis truncata. Panicula 2–4 poll. longa, ramis subdistantibus brevissimis superne approximatis, ramulis conglomeratis."

The description is vivid; the photograph (our PLATE 757, FIG. 1) of Link's type sent me by Professor Diels unequivocal.

The more northern *Dactylogramma cinnoides* differs in several characters from the relatively southern *Muhlenbergia glomerata*. In the latter the flowering culms bear 7–15 leaves, many of them often crowded and overlapping at the middle nodes; in the former there are 5–8 (rarely –10) more scattered leaves. In *M. glomerata* the panicle, as correctly defined by Willdenow, has round-tipped spikes mostly crowded to form a subcontinuous lobulate-spiciform inflorescence; in *D. cinnoides* the spikes or branches, except the upper, are more scattered or subdistant and less rounded at summit. In *M. glomerata* the inflorescence is often purplish, sometimes green; in *D. cinnoides* green, though sometimes purplish. The panicle of *M. glomerata* has a misty appearance, the awns and glumes not sharply visible. This comes from the copiously hispid keels and awns. In *D. cinnoides* the panicle has the glumes and awns more clearly visible, the keels and awns being merely scabrous with definitely shorter trichomes. These differences, with no appreciable difference in anthers and grains, seem to me varietal, rather than specific, and I am treating *D. cinnoides* as a northern geographic variety of the more southern plant.

Unfortunately, however, there is an earlier valid specific name for true *Muhlenbergia glomerata* (Willd.) Trin., which was based on *Polypogon glomeratus* Willd. (1809). This is *Polypogon setosus* Spreng. Mant. Fl. Hal. 31 (1807). That it is specifically identical with the Muhlenberg material which formed the basis of Willdenow's species is clear from the description; the photo-

Photo. B. G. Schubert.

MUHLENBERGIA RACEMOSA: FIG. 1, characteristic summit of plant, × 1, from Minnesota; FIG. 2, summit of glabrous and lustrous internode and node and base of sheath, × 5, from Wisconsin; FIG. 3, portion of panicle to show characteristic small anthers, × 4, from Illinois.

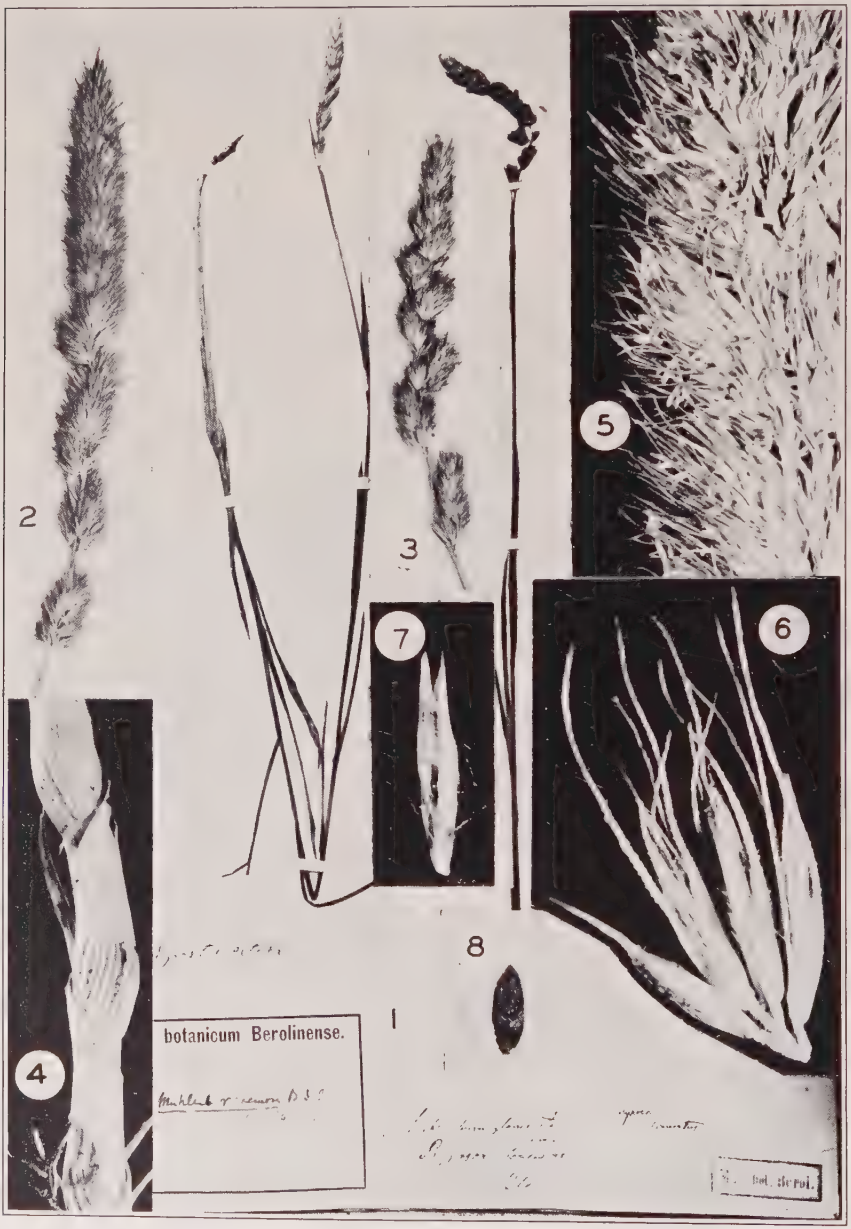


Photo. B. G. Schubert.

MUHLENBERGIA SETOSA: FIG. 1, type of POLYPOGON SETOSUS, × ⅓; FIG. 2, panicle, × 1, from Massachusetts; FIG. 3, panicle, × 1, from Pennsylvania; FIG. 4, portion of rhizome, × 4, from Nova Scotia; FIG. 5, portion of panicle to show characteristic long anthers, × 4, from Massachusetts; FIG. 6, spikelets, × 10, from Massachusetts; floret showing basal villi, × 10, from Pennsylvania; FIG. 8, grain, × 10, from Pennsylvania.

graph of Sprengel's type (our PLATE 755, FIG. 1), for which I am also indebted to Professor Diels, is certainly of the plant of eastern Pennsylvania. Sprengel's description was to the point:

> 9. POLYPOGON SETOSUS, panicula spicaeformi, glumis acuminatis aristatis scabris, foliis involutis rigidis.
>
> *Culmus* teres, glaber, foliosus, pedalis. *Folia* glabra, vaginantia, involuta, rigida. *Panicula* terminalis, parumper ex ultimo folio emergens, fusca, densè spicaeformis, ramulis glomeratis contractis. *Gluma* calycina valvulis acuminatis scabris aristatis, uniflora, corolla paullo maior. *Gluma* corallina valvulis acuminatis muticis.
>
> E Pensylvania. *Muhlenb.*

In his De Graminibus Unifloris et Sesquifloris, 195 (1824), after properly transferring several species to *Muhlenbergia*, Trinius took a short cut and merely stated that certain species belonged to that genus: "Ad sectionem *a* (*Mühlenbergiam*) pertinent: . . . Polypogon setosus *Spreng.*", but the combination, ascribed to Trinius at this place and with the correct synonym, *M. glomerata*, was made in Index Kewensis. The species with culms simple or sparingly branched at base and with scabrous-puberulent internodes, large anthers and small grains is, then, M. SETOSA (Spreng.) Trin. ex Hook. f. & Jackson, Ind. Kew. ii. 209 (1894).

Summarizing this rather verbose but seemingly necessary discussion, the five species of *Muhlenbergia* specially considered resolve themselves as follows (omitting *M. sylvatica* which, except for the designation of a variety, is unchanged). In order to clarify the complex questions I am reproducing photographs of types in so far as they are before me and sufficiently clear for reproduction. These I am supplementing by some of Dr. Bernice G. Schubert's very clear enlargements of pertinent details.

MUHLENBERGIA **frondosa** (Poir.), comb. nov. *Agrostis frondosa* Poir. in Lam. Encyc. Suppl. i. 252 (1790). *A. foliosa* Roem. & Schultes, Syst. ii. 373 (1817), substitute-name for *A. frondosa*. *M. foliosa* (Roem. & Schultes) Trin. Gram. Unifl. 196 (1824), not recent auth. *M. mexicana* sensu most recent auth., not (L.) Trin.—For diagnostic characters see no. 1 in key. PLATES 749 and 750.

M. FRONDOSA, forma **commutata** (Scribn.), comb. nov. *M. mexicana commutata* (as subsp.) Scribn. in RHODORA, ix. 18 (1907), at least as to TYPE, *Fernald*, no. 522, designated by Hitchc. Man. 890 (1935), where Scribner's trinomial "n. subsp." is cited as "var." *M. mexicana*, var. *commutata* (Scribn.) Farwell in Rep. Mich. Acad. Sci. xvii. 181 (1916). *M. commutata*

(Scribn.) Bush in Am. Midl. Nat. vi. 61 (1919). *M. mexicana,* forma *commutata* (Scribn.) Wiegand in Rhodora, xxvi. 1 (1924).

M. mexicana (L.) Trin. Gram. Unifl. 189 (1824). *Agrostis mexicana* L. Mant. i. 31 (1767); Jacq. f. Eclog. Pl. Rar.-Gram. Fasc. ter. et quart. 44, t. 30 (1813). For other synonyms based on *A. mexicana* see Hitchcock. *M. foliosa* sensu most recent auth., not (R. & S.) Trin. For diagnostic characters see no. 2 in key. Plates 751 and 752.

M. mexicana forma **ambigua** (Torr.), comb. nov. *Agrostis filiformis* Willd. Enum. i. 95 (1809). *Cinna filiformis* (Willd.) Link, Enum. i. 70 (1821). *Agrostis lateriflora,* var. *filiformis* (Willd.) Torr. Fl. N. Mid. U. S. 86 (1823). *M. ambigua* Torr. in Nicollet, Rep. Miss. 164 (1843). *M. mexicana filiformis* (Willd.) Scribn. in Mem. Torr. Bot. Cl. v. 36 (1894). *M. foliosa ambigua* (Torr.) Scribn. in Rhodora ix. 20 (1907). *M. ambigua,* var. *filiformis* (Willd.) Farwell in Mich. Acad. Sci. Rep. xx. 168 (1919). *M. foliosa,* forma *ambigua* (Torr.) Wiegand in Rhodora, xxvi. 1 (1924).

M. mexicana, forma **setiglumis** (S. Wats.), comb. nov. *M. sylvatica,* var. *setiglumis* S. Wats. in King, Geol. Expl. 40th Paral. v. 378 (1871). *M. foliosa setiglumis* (S. Wats.) Scribn. in Rhodora, ix. 20 (1907). *M. setiglumis* (S. Wats.) Nels. & Macbr. in Bot. Gaz. lxi. 30 (1916).

M. sylvatica Torr., var. **robusta,** var. nov., culmis rigidis arcte adscendentibus; foliis firmis ad 5–9 mm. latis; paniculis densioribus; glumis late lanceolatis vel lanceolato-ovatis; lemmatibus 3–4 mm. longis longe aristatis; antheris 0.5–0.7 mm. longis; caryopsibus 1.9–2.1 mm. longis.—Open woods and thickets, central Maine to western New York and eastern Pennsylvania. The following are characteristic. Maine: Austin Stream, Moscow, August 27, 1902, *Collins & Chamberlain;* Sydney, August 18, 1916, *Fernald & Long,* no. 12,597 (type in Herb. Gray). New Hampshire: by Merrimac River below Bedford, August 27, 1931, *Fernald & Griscom,* no. 2495; Gilsum, August 9, 1899, *Fernald,* no. 287; Wilton, August 15, 1916, *C. F. Batchelder.* Vermont: Grand Isle, July 24, 1935, *Knowlton.* Massachusetts: Needham, August 31, 1884, *T. O. Fuller;* Blue Hills Reservation, September 22, 1895, *E. F. Williams;* Huntington, August 17, 1912, *Robinson,* no. 358. Rhode Island: Lincoln, October 2, 1910, *E. F. Williams.* Connecticut: Sprague, September 1, 1905, *Woodward;* Reynold's Bridge, September 4, 1910, *Blewitt;* Bridgeport, September 22, 1896, *Eames.* New York: Starbuckville, August 26, 1932, *Muenscher & Lindsey,* no. 2954; Genoa, August 21, 1918, *Wiegand,* no. 9185; Ithaca, September 5, 1916, *F. P. Metcalf,* no. 5613; Butler, October 5, 1916, *Metcalf & Wright,* no. 5614. Pennsylvania: Wayne, October 15, 1910, *Bartram,* no. 1313.

Typical *Muhlenbergia sylvatica* has relatively weak and loosely ascending culms; the leaves subflaccid, the larger ones 2–7 mm. wide; the panicle very loose; the glumes linear-lanceolate to linear-attenuate, the 2d about equaling to slightly exceeding the blade of the lemma, the latter 2.3–3 mm. long; the anthers 0.3–0.6 mm. long; the mature grain nearly or quite free, 1.4–1.8 mm. long. It is widely distributed, from southwestern Quebec to Minnesota, south to North Carolina, Alabama, Arkansas and northeastern Texas.

Var. *robusta* is stiffer and larger in all parts. Its leaves are firm and more ascending, the larger ones 5–9 mm. broad; the panicle fuller; glumes broadly lanceolate to lance-ovate, shorter than the blade of the lemma, the latter 3–4 mm. long; anthers 0.5–0.7 mm. long; grain more firmly embraced and 1.9–2.1 mm. long.

M. RACEMOSA (Michx.) BSP. Prelim. Cat. N. Y. 67 (1888), by inference. *Agrostis racemosa* Michx. Fl. Bor.-Am. i. 53 (1803). *Polypogon racemosus* (Michx.) Nutt. Gen. i. 51 (1818). *Cinna racemosa* (Michx.) Kunth, Rév. Gram. i. 67 (1829). *M. glomerata*, var. *ramosa* Vasey, Descr. Cat. Grasses U. S. 40 (1885). *M. racemosa*, var. *ramosa* Vasey in Beal, Grasses N. Am. ii. 253 (1896). For diagnostic characters see no. 4 in key. PLATES 753 and 754.

M. SETOSA (Spreng.) Trin. ex Hook. fil. & Jackson, Ind. Kew. iii. 209 (1894). *Polypogon setosus* Spreng. Mant. Fl. Hal. 31 (1807). *P. glomeratus* Willd. Enum. 87 (1809). *Alopecurus glomeratus* (Willd.) Poir. in Lam. Encycl. v. 495 (1817). *Agrostis setosa* (Spreng.) Muhl. Descr. Gram. 68 (1817). *Trichochloa glomerata* Trin. Fund. Agrost. 117 (1820). *T. calycina* Trin. l. c. (1820). *M. glomerata* (Willd.) Trin. Gram. Unifl. 191, pl. 5, fig. 10 (1824). *M. calycina* Trin. l. c. 193 (1824). *Podosaemum glomeratum* (Willd.) Link, Hort. Berol. i. 84 (1827). *Cinna glomerata* (Willd.) Link, l. c. ii. 237 (1833). For specific characters see no. 5 in key.—Typical *M. setosa* has the leaves of flowering culms 7–15, many of them often browded and overlapping at the middle nodes; panicle purplish, fuscous or green, with all but the lowest of the densely flowered ellipsoid to rounded-obovoid branches closely crowded, the panicle thus appearing densely lobulate-spiciform; keel and awns of glumes copiously hispid, thus giving the inflorescence a "misty" aspect.—Meadows, bogs and wet shores, western Nova Scotia and southern Maine to southern Ontario and Michigan, south to southern New England, northern New Jersey, Pennsylvania, mountains to North Carolina, and Indiana. PLATES 755 and 756; MAP 1.

Var. **cinnoides** (Link), comb. nov. *Dactylogramma cinnoides* Link, Enum. Hort. Berol. ii. 248 (1833).—Differing from typical *M. setosa* in having fewer (5–8, rarely –10) and usually more scattered leaves; panicle usually green, rarely purple-tinged, usually more interrupted, the cylindric to oblong-ovoid often subacute lower branches often remote; glumes slightly broader, with merely scabrous keel and awn (the panicle, therefore, not appearing "misty").—Similar habitats, Newfoundland to Alberta, south to Nova Scotia, northern Massachusetts, Connecticut, New York, central Pennsylvania, Michigan, Wisconsin, Minnesota, Wyoming, Nevada and Oregon. PLATE 757; MAP 2.

PLATE 749. MUHLENBERGIA FRONDOSA (Poir.) Fern.: FIGS. 1, 2 and 3, fragments from TYPE of *Agrostis foliosa* Roem. & Schultes, × 5, from portions of type in Herb. U. S. Nat. Mus., kindness of Mr. *Jason R. Swallen;* FIG. 4, two spikelets, × 4, from Bridgeport, Connecticut, September 7, 1893, *Eames;* FIG. 5, floret, × 10, from Shirley, Massachusetts, October 4, 1914, *J. R. Churchill;* FIG. 6, grain, × 10, from last specimen.

PLATE 750. MUHLENBERGIA FRONDOSA (Poir.) Fern.: FIG. 1, a characteristic decumbent branch, × ⅓, from East Jaffrey, New Hampshire, *B. L. Robinson,* no. 395; FIG. 2, characteristic glabrous internode, open and compressed sheaths and partly included axillary panicle, × 5, from Stratford, New Hampshire, *Pease,* no. 23,921; FIG. 3, portion of rhizome, × 4, to show cucullate-arching scales, from no. 23,921.

PLATE 751. MUHLENBERGIA MEXICANA (L.) Trin.: FIG. 1, TYPE of AGROSTIS MEXICANA L., basis of the species, × ½, from Herb. Linn., kindness of the late Dr. *B. Daydon Jackson;* FIG. 2, portion of panicle of TYPE, × 5, from fragment in Herb. U. S. Nat. Mus., kindness of Mr. *Jason R. Swallen;* FIG. 3, two spikelets, × 10, from Lanoraie, Quebec, *Victorin & Rolland,* no. 29,030.

PLATE 752. MUHLENBERGIA MEXICANA (L.) Trin.: FIG. 1, plate of Jacquin f., × ⅔; FIG. 2, portion of opaque and puberulent internode and node and base of sheath, × 5, from Worthington, Massachusetts, *B. L. Robinson,* no. 649; FIG. 3, floret, × 10, from St.-Hubert, Quebec, *Victorin & Rolland,* no. 33,968; FIG. 4, grain, × 10, from shore of Delaware River, Sussex County, New Jersey, September 15, 1917, *E. B. Bartram.*

PLATE 753. MUHLENBERGIA RACEMOSA (Michx.) BSP.: FIG. 1, TYPE (two pieces) × ½, of *Agrostis racemosa* Michx., basis of species, from Herb. Michaux, Paris, kindness of Professor *Humbert;* FIG. 2, panicle, × 1, from Menard County, Illinois, 1861, *E. Hall;* FIG. 3, panicle, × 1, from near Princeville, Peoria County, Illinois, *V. H. Chase,* no. 940; FIG. 4, spikelet, × 10, from Fort Snelling, Minnesota, *Mearns,* no. 747; FIG. 5, floret, showing basal villi, × 10, from no. 747; FIG. 6, grain, × 10, from near Oquawka, Illinois, *Patterson.*

PLATE 754. MUHLENBERGIA RACEMOSA (Michx.) BSP.: FIG. 1, a characteristic summit of a plant, × 1, from Fort Snelling, Minnesota, *Mearns,* no. 747; FIG. 2, summit of glabrous and lustrous internode and node and base of sheath, × 5, from La Crosse, Wisconsin, 1861, *T. J. Hale;* FIG. 3, portion of panicle, × 4, to show the small anthers, from near Princeville, Peoria County, Illinois, *V. H. Chase,* no. 940.

PLATE 755. MUHLENBERGIA SETOSA (Spreng.) Torr.: FIG. 1, TYPE of *Polypogon setosus* Spreng., basis of the species, × ca. ⅓, from Herb. Berol., kindness of Professor *Diels;* FIG. 2, panicle, × 1, from Walpole, Massachusetts, September 7, 1896, *J. R. Churchill;* FIG. 3, panicle, × 1, from northwest of Pleasant Valley, Bucks County, Pennsylvania, September 15, 1923, *Benner;* FIG. 4, portion of rhizome, to show appressed scales, × 4, from west of Centreville, Digby County, Nova Scotia, *Graves & Linder,* no. 19,865; FIG. 5, portion of panicle, × 4, to show long anthers, from Walpole, Massachusetts, September

2, 1883, *Walter Deane;* FIG. 6, group of spikelets, × 10, from Muddy Pond, West Roxbury, Massachusetts, *C. E. Faxon;* FIG. 7, floret, × 10, showing few slender basal villi, from Mt. Bethel, Northampton County, Pennsylvania, October 4, 1908, *Van Pelt;* FIG. 8, grain, × 10, from the last (*Van Pelt*) specimen.

PLATE 756. MUHLENBERGIA SETOSA (Spreng.) Trin.: FIG. 1, TYPE of *Polypogon glomeratus* Willd., basis of *M. glomerata* (Willd.) Trin., × ⅓, from Herb. Willdenow, kindness of Professor *Diels;* FIG. 2, opaque and puberulent internode and node and base of sheath, × 5, from northwest of Pleasant Valley, Bucks County, Pennsylvania, September 15, 1923, *Benner.*

PLATE 757. MUHLENBERGIA SETOSA (Spreng.) Trin., var. CINNOIDES (Link) Fern.: FIG. 1, TYPE of *Dactylogramma cinnoides* Link, basis of the variety, × ca. ⅓, from Herb. Berol., kindness of Professor *Diels;* FIG. 2, panicle, × 1, from Grand Falls, Newfoundland, *Fernald & Wiegand,* no. 4531; FIG. 3, portion of panicle, to show elongate anthers (as black lines), × 4, from Fort Kent, Maine, August 21, 1913, *R. W. Woodward;* FIG. 4, floret, to show villi running high on lemma, × 10, from no. 4531; FIG. 5, grain, × 10, from River Ste. Anne des Monts, Gaspé County, Quebec, August, 1905, *Collins & Fernald.*

II. NOTES ON DANTHONIA

The two common species of *Danthonia* in eastern Canada, New England and New York are in general well defined, although the conventional differential characters of the lemma used by Hitchcock in Gray's Manual, ed. 7, and by Nash in Britton & Brown's Illustrated Flora are essentially valueless. As expressed by Hitchcock these are:

"Teeth of the lemma triangular, not aristate.....1. *D. spicata.*
Teeth of the lemma aristate.
Flowers not over 5 mm. long.....2. *D. compressa.*"

Under the specific treatments the lemmas of *D. spicata* are said to be "4–5 mm. long, sparsely clothed with stiff hairs, *teeth triangular*", while *D. compressa* has the "*teeth of the lemma aristate, at least 2 mm. long.*" In practice this character so frequently breaks that it has been abandoned by later authors, and in his Manual Hitchcock relies upon the contracted panicle and relatively short blades of *D. spicata* as contrasted with the more open panicle and longer leaves of *D. compressa.*

The best key I have seen is that of Wiegand & Eames in their Flora of the Cayuga Lake Basin. For wholly typical *D. spicata* and *D. compressa* it is satisfactory; the difficulty is that so much material is not typical. In the series which everyone would accept as *D. spicata* in the broad sense, the lemma varies from 2–6.5 mm. long and its back may be densely pilose, sparingly pilose, strigose or quite glabrous, its teeth from broadly triangular to lance-attenuate and awnless or awned. Such variation is

largely without apparent geographic limit, though two well defined geographic varieties, var. *pinetorum* Piper and var. *longipila* Scribn. & Merr., are strongly marked; the former boreal and transcontinental, with lemmas often so large as to be mistaken for those of *D. intermedia* Vasey; the latter with the shortest lemmas of the series and a definitely southern range. The sheaths and blades of any of the variations may be glabrous, sparingly pilose or even long-villous; and to the latter tendency, without checking the original account, has been erroneously applied the name var. *longipila*. If forms of the common northern plant with pubescent foliage are to be distinguished, they have an earlier name, evidently intended for them, in *D. spicata*, var. *villosa* Peck (1894).

My chief reason for now publishing this note is to direct attention to a complex series of very large plants which in some ways stand between *Danthonia spicata* and *D. compressa* but which, in extreme development, have been mistaken for the southeastern *D. sericea* Nutt. These are the coarse midsummer- or autumn-flowering plants with stout culms up to 1 m. high; long, stiff and mostly erect basal leaves; panicle as in *D. spicata* but with more numerous and larger spikelets; glumes up to 2.5 cm. long; and lemmas up to 6.5 mm. long; these and the long glumes often leading collectors to place New England specimens with the more southern *D. sericea*. In this complex and mostly northern coarse series the culms may be terete to base, as in *D. spicata*, or the lower internodes may be trigonous or laterally compressed and with the narrower side broadly concave, as in *D. compressa*. The uppermost leaf may be short and remote from the long-exserted panicle, as in *D. spicata*, or (even from the same root) prolonged and reaching or overtopping the panicle as in *D. compressa*. The twisted base of the awn may be dark brown to purplish, as in *D. spicata*, or stramineous or pale, as in *D. compressa*. The panicle is more like that of *D. spicata* but large and dense. Furthermore, whereas *D. spicata* (typical) flowers in New England from late May to early July and *D. compressa* in June and July, the coarse plant flowers chiefly from August to October. If culms with trigonous to compressed lower internodes be selected they will belong to *D. Alleni* Austin (1872), while other culms (often in the same tussock), with the inter-

nodes terete, will be *D. Faxoni* Austin (1877). It might be assumed that *D. Alleni* (including *D. Faxoni*) is a series of hybrids, with unusual hybrid vigor; but it is found to the northeast of the limit of *D. compressa*, while to the northwest it extends 450 miles north of the northwestern limit of the latter species. If sometimes a hybrid it is not always so.

In many of its stations *Danthonia Alleni* occurs in recent clearings or burns where the loose litter and often the ashes from fires stimulate all plants; in such cases it appears like overstimulated specimens, in which rankness of growth, multiplication of spikelets and enlargement of their parts are the result. In other cases the autumnal coarse culms and panicles suggest the second flowering in many species of *Carex*, where autumnal inflorescences are larger, fuller and often more crowded than the normal vernal ones. Again, the panicles of *D. Alleni* may be greatly distorted and with apparent signs of fungus- or insect-attack, with gnarled or crumpled branches, tendencies to fasciation, and sometimes the gathering of spikelets into glomerules. All in all, *D. Alleni* is a heteromorphic series well worth close observation by those situated to watch it. That it is a true species is very improbable. It is presumably the result of very diverse conditions which have resulted in parallel developments; and, in view of the well known development within the leaf-sheaths of this genus of cleistogamous florets, it is not improbable that every alteration of *D. spicata* and *D. compressa*, whether by crossing through wind-pollination or stimulation in other ways, may be somewhat perpetuated through the cleistogenes. Similarly the very diverse lemmas of *D. spicata*, whether with awnless or awned teeth triangular or lanceolate, the backs pilose or glabrous, may thus be carried on in local colonies. The genus is an appropriate one for close study from many viewpoints.

I am distinguishing the two undoubted species and the wholly dubious *Danthonia Alleni* by the following characters.

a. Culms erect or straight, with stiffly erect panicles, the internodes terete (sometimes compressed or triangular in no. 2); basal crowded leaves much shorter than culm (sometimes elongate in no. 2), the lower cauline ones commonly 3–15 cm. long, the uppermost (except sometimes in no. 2) usually 1–10 cm. long and becoming remote from the panicle; ligule (except sometimes in no. 2) of stiff hairs 0.4–1.5 mm. long; panicle-branches ascending to erect, tightly appressed in fruit; spiraling base of awn usually

dark brown to purplish, strongly contrasting with the paler and straightish summit.

Culms slender, 0.5–1.5 mm. thick (dried) at base, 1–6 dm. high, with terete internodes; panicle remote from upper leaf, mostly with 2–13 spikelets; longer glume 7–11 mm. long, if longer with faint or obscure lateral nerves; base of awn dark-colored ..... 1. *D. spicata.*

Culms stout, 1.5–2.5 mm. thick at base, mostly 0.5–1 m. high, the lower internodes terete, or triangular and with one concave side; panicle either remote or closely subtended by upper leaf, dense, usually with 9–20 spikelets; longer glume lance-attenuate, 1.1–2.5 cm. long, prominently 3–7-ribbed; base of awn light to dark brown .... 2. *D. Alleni.*

a. Culms slightly geniculate at the nodes, the summit usually arching; some of the lower internodes trigonous or compressed and often with the narrower side broadly concave; basal leaves prolonged, one half as long as to equaling culm; lower cauline leaves prolonged, 1.5–4 dm. long, the uppermost nearly reaching or overtopping the panicle; ligule 2–4 mm. long, of flexuous hairs; panicle lax and open or with branches finally loosely ascending, the remote lower branches usually strongly divergent, not closely appressed in fruit; spiraling base of awn pale brown or straw-colored ..... 3. *D. compressa.*

1. D. SPICATA (L.) Beauv. consists of three fairly defined and many less definite variations, as follows.

a. Column of florets three fourths to quite as long as the firm glumes; panicle with (1–) 2–13 (–15) spikelets; lower leaves flat or involute; culms firm, 0.5–1.5 mm. thick at base.

Glumes lance-attenuate, tapering from near base, with 3–5 strong ribs besides the midrib, covering only the base of the column of florets, the sinus at crossing of the glumes one sixth to one fourth as high as the tip of the longest glume; basal marcescent leaves strongly curving and twisting ..... *D. spicata*, var. *typica.*

Glumes oblong-lanceolate, tapering from near or above the middle, with weak or obscure lateral ribs, usually covering all but the summit of the column of florets, the sinus at crossing of the glumes one fourth to half as high as the tip of the upper glume; basal leaves only slightly if at all curling ..... Var. *pinetorum.*

a. Column of florets only one half to three fifths as long as the thin and hyaline ribless or only faintly ribbed glumes; spikelets 3–7, scattered; culms delicate, 0.5–1 mm. thick at base; basal leaves filiform-involute or becoming so, curved ..... Var. *longipila.*

D. SPICATA (L.) Beauv., var. **typica.** *Avena spicata* L. Sp. Pl. i. 80 (1753). *A. glumosa* Michx. Fl. Bor.-Am. i. 72 (1803). *D. glumosa* (Michx.) Beauv. Ess. Agrost. 92, 153 and 160 (1812). *D. spicata* (L.) Beauv. ex Roem. & Schultes, Syst. ii. 690 (1817). *Merathrepta spicata* (L.) Raf. ex Hook. f. & Jacks. Ind. Kew. iii.

211 (1894) in synonymy. *D. spicata*, var. *villosa* Peck in N. Y. State Mus. Ann. Rep. xlvii. 168 (repr. 42) (1894), the form with villous blades. *Pentameris spicata* (L.) Nels. & Macbr. in Bot. Gaz. lvi. 470 (1913).—Dry to damp and peaty soils or in thin woodland, southern Quebec to Minnesota, south to Nova Scotia, New England, Long Island, northwestern Florida, Alabama, Tennessee and Missouri. May–early July.

Var. PINETORUM Piper, as *D. spicata pinetorum* Piper in Erythea, vii. 103 (1899), described in detail, although its author did not appreciate the characters, saying of it "scarcely more than a variety of that species [*D. spicata*], differing mainly in character of pubescence." *D. thermalis* (as *thermale*) Scribn., U. S. Dept. Agric., Div. Agrost. Circ. no. 30: 5 (1901). *Merathrepta pinetorum* (Piper) Piper, Contrib. U. S. Nat. Herb. xi. 122 (1906). *M. thermalis* (as *thermale*) (Scribn.) Heller, Muhlenbergia, v. 120 (1909). *M. thermalis* (as *thermale*), var. *pinetorum* (Piper) Piper ex Fedde & Schust. in Just, Bot. Jahresb. xxxvii. 128 (1911). *Pentameris thermalis* (as *thermale*) (Scribn.) Nels. & Macbr. l. c. (1913). *D. pinetorum* (Piper) Piper in Piper & Beattie, Fl. Nw. Coast, 46 (1915).—Dry to moist open soil, Newfoundland and Côte Nord, Quebec, to British Columbia, south to Nova Scotia, New Brunswick, northern New England, Bruce Peninsula, Ontario, northern Michigan, northern Wisconsin, Black Hills, South Dakota, New Mexico and Oregon.—Since this variety has not been heretofore recorded from east of northern Michigan a few characteristic eastern specimens of it may well be cited. NEWFOUNDLAND: Glenwood, *Fernald & Wiegand*, no. 4600; Grand Falls, *Fernald, Wiegand, Bartram & Darlington*, nos. 4601 and 4602; St. John's Island, *Fernald et al.* no. 27,466; Middle Arm, Bonne Bay, *Fernald, Long & Fogg*, no. 1300; North Arm, Bay of Island, *Long & Fogg*, no. 74; French (or Tweed) Island, Bay of Islands, *Fernald, Long & Fogg*, no. 76; Blomidon ("Blow-me-down") Mountains, *Fernald & Wiegand*, nos. 2591 and 2595; Mt. Musgrave to Humber Mouth, *Fernald & Wiegand*, no. 2590. QUEBEC: Mingan, *St. John*, no. 90,140; Anticosti Island, *Victorin*, or *Victorin et al.* nos. 4077, 20,536 and 20,537, 20,542, 20,598, 24,344–24,346, 27,795, 27,797, 27,798, 28,050, 28,055 and 28,060; Percé, *Fernald & Collins*, no. 870; River Ste. Anne des Monts, *Fernald & Collins*, no. 413; Bic, *Fernalds & Collins*, no. 869; Rivière du Loup, *Victorin*, nos. 22 and 81; Montmorency Falls, *Macoun*, no. 69,231; Saint-Romuald, *Louis-Marie*, no. 20,541. NEW BRUNSWICK: Bass River, July 30, 1875, *Fowler;* Shediac Cape, *F. T. Hubbard*, no. 720. NOVA SCOTIA: St. Paul Island, *Perry & Roscoe*, nos. 64–66; Middleton, *Fernald, Pease & Long*, no. 19,953; Argyle, *Long & Linder*, no. 19,957; Abram River, *Fernald, Bean & White*, no. 19,956. MAINE: at 4000–4500 ft., North Basin, Mt. Katahdin, July 14, 1900, *Fernald;* Township

ix, Range 17, Somerset County, *St. John*, no. 2134; Madison, August 21, 1894, *Fernald*. New Hampshire; near Half-way House, Thompson & Meserve Purchase, *Pease*, no. 12,817. Vermont: Willoughly, July 11, 1896, July 18, 1898 and September 14, 1898, *G. G. Kennedy*.

Var. longipila Scribn. & Merr. U. S. Dept. Agric., Div. Agrost. Circ. no. 30: 7 (1901).—Sandy or rocky woods and clearings, North Carolina and Alabama to New Mexico, north to Connecticut, Pennsylvania, Kentucky, Missouri and eastern Kansas. Late May–September, The following are characteristic. Connecticut: Woodbury, July 13, 1932, *Eames*. Pennsylvania: Philadelphia, 1862, *C. E. Smith*. Virginia: eastern slope of Bull Run Mountain, Prince William County, *Allard*, no. 3850; south of Aldie, Fauquier County, *Allard*, no. 859; 4 miles northwest of Dixie Caverns, Roanoke County, *Wood*, no. 2609; Great Neck, Princess Anne County, *Fernald, Griscom & Long*, no. 4553; Claremont Wharf, Surry Co., *Fernald & Long*, no. 9829; Carey Bridge, Southampton County, *Fernald & Long*, no. 11,950; Cypress Bridge, Southampton County, *Fernald & Long*, no. 11,949. North Carolina: Locust, Stanly County, *Blomquist, Correll & Garren*, no. 7753; Highlands, Macon County, *Biltmore Herb.*, no. 343°. Kentucky: Hawesville, Hancock County, *E. J. Palmer*, no. 17,804. Alabama: Mobile, *C. Mohr*, as *D. sericea*. Missouri: Indian Creek, Benton County, *Demetrio*, no. 87; Mansfield, *Lansing*, no. 3103. Kansas: Cherokee County, *Hitchcock*, no. 905. Oklahoma: base of Rich Mt., near Page, Leflore County, *Stevens*, no. 2674. Texas: Dallas, *Reverchon;* Terrell, Kaufman County, May 4, 1904, *F. J. Tyler*. New Mexico: 1847, *Fendler*.

When they published var. *longipila*, from Arkansas, Scribner & Merrill laid stress on the "scattered ascending hairs", on the leaf-blades, a character which appears in the other varieties of the species and which may be absent from much material of otherwise good var. *longipila*. The distinctive features of this southern extreme are the very slender culms, usually filiform-involute leaves, and the small florets in relatively short columns, characters brought out in the original description: "A slender form . . . with small, few-flowered panicles and smaller spikelets than in the species. Leaf blades very narrow, involute . . . Flowering glumes 2 to 2.5 mm. long, pilose."

2. D. Alleni Austin in Bull. Torr. Bot. Cl. iii. 21 (1872). *D. Faxoni* Austin, l. c. vi. 190 (1877).—Open shores, rocky or arid openings, clearings and burns, Magdalen Islands to Algoma District, Ontario, south to Nova Scotia, Maine, Massachusetts,

Delaware, mountains of North Carolina, and Ohio. Late June–October.—The following, selected from twice as many specimens, are characteristic. QUEBEC: Baie St. Paul, Charlevoix County, *Pease*, no. 27,471. MAGDALEN ISLANDS: Grindstone, *Fernald, Bartram, Long & St. John*, no. 6870. PRINCE EDWARD ISLAND: Alberton, *Fernald & St. John*, no. 6869. NOVA SCOTIA: Canso, Guysborough County, *Rousseau*, no. 35,452 bis; Bridgewater, Lunenburg County, *Fernald et al.*, no. 19,951. MAINE: Houlton, *Fernald & Long*, no. 12,659; Orono, September 25, 1890, and September 1, 1893, *Fernald;* Peaked Mt., Clifton, August 22, 1897, *Fernald;* Pleasant Pond, Somerset County, August 18, 1902, *Collins & Chamberlain;* Chesterville, *Kate Furbish;* Oxford, July 12, 1914, *Weatherby;* Pleasant Mt., Denmark, *Pease*, no. 19,628; Cutler, August 19, 1902, *Kate Furbish;* Pembroke, *Fernald*, no. 1309; Somesville, Mt. Desert I., September 22, 1892, *Fernald;* Southport, August 1, 1894, *Fernald;* Bear Mt., Livermore, July 25, 1896, *Kate Furbish;* South Berwick, *Parlin & Fernald*, no. 934. NEW HAMPSHIRE: Gorham, *Pease*, no. 17,337; Notch of the White Mts., August 27 and September 3, 1877, *C. E. Faxon*, TYPE collection of *D. Faxoni;* Crawford Notch, *Greenman*, nos. 1276 and 1277; Crawford Notch, Hart Location, *Pease*, no. 11,727; base of Mt. Willard, August 28, 1877, *Faxon;* North Woodstock, Woodstock, *Fernald*, no. 11,550; Plymouth, *Fernald*, no. 14,995; Washington, *Fernald & Svenson*, no. 768; Nashua, *Fernald & Svenson*, no. 769; Pelham, 1895, *F. W. Batchelder.* MASSACHUSETTS: Amesbury, 1897, *A. A. Eaton;* Pepperell, August 30, 1886, *C. W. Swan;* Concord, September 8, 1858, *Thoreau;* Ashland, July 3, 1884, *W. Deane;* Savin Hill, Dorchester, September 5, 1852, *Wm. Boott;* Plymouth, *Fernald.* no. 767; Brewster, *Fernald*, no. 17,948; Chatham, *Fernald & Long*, no. 8751; Nantucket Island, *Bicknell*, no. 9854; Shrewsbury, *J. W. Robbins*, as *D. sericea* Nutt.; Whitcombe Summit, Berkshire County, *H. D. House*, no. 25,893. NEW YORK: Babylon, Long Island, *T. F. Allen*, ISOTYPES of *D. Alleni*, also *Svenson*, no. 6800; Rockaway, Long Island, September 20, 1869, *W. H. Leggett:* NEW JERSEY: Nanasquan, June 26, 1929, *J. R. Churchill.* PENNSYLVANIA: Chester Valley, 2 miles north of Devon, Chester County, October 24, 1921, *H. B. Meredith.* DELAWARE: **"WM. M. CANBY,** WILMINGTON, DELAWARE". NORTH CAROLINA: Roan Mt., July, 1889, *Scribner.* ONTARIO: Cloche Peninsula, Manitoulin District, *Fernald & Pease*, no. 3103; cliffs by Lake Superior, Pancake Bay, Algoma District, *Pease & Ogden*, no. 24,989. OHIO: near Garrettsville, Portage County, June 19, 1910, *A. N. Rood.*

3. D. COMPRESSA Austin in Peck, N. Y. State Mus. Ann. Rep. xxii. 54 (1869). *D. spicata*, var. *compressa* (Austin) Wood, Am. Bot. and Fl. pt. 4: 396 (1873). *Merathrepta compressa* (Austin) Heller, Muhlenbergia, v. 120 (1909). *Pentameris compressa*

(Austin) Nels. & Macbr. in Bot. Gaz. lvi. 469 (1913).—Woodlands and clearings, southern Quebec to Ohio, south to Nova Scotia, New England, Long Island, Virginia, and upland of North Carolina and Tennessee. June–August.

III. ERIANTHUS BREVIBARBIS AND OTHER SPECIES

(Plates 758–761)

Erianthus **coarctatus,** sp. nov. (tab. 758), culmis rigidis 0.75–1.5 m. altis, ad basin 3–6 mm. diametro, nodis 4–6 barbatis barbis deciduis; foliis caulinis 4–6, vaginis glabris, laminis scabris e basi valde angustato sublanceolato-linearibus 2–10 mm. latis nerviis lateralibus prominulis utrinque 3–5; lamina superiore valde reducta 4–12 cm. longa; panicula lanceolata densa 1–1.7 dm. longa 3–4 cm. diametro basi deinde exserta, racemis valde adpressis 2–5 cm. longis; spiculis sessilibus lanceolatis, glumis strigoso-hirtellis 6.5–8 mm. longis, coma basilari 4–5 mm. longa; pedicellis strigoso-hirtellis; arista tereti porrecta 1.6–2 cm. longa. —Delaware, eastern Maryland and eastern Virginia. Delaware: fencerow, ¼ mile east of Ellendale, Sussex County, October 12, 1940, *R. R. Tatnall,* no. 4745. Maryland: roadside 5 miles north of Princess Anne, Somerset County, October 2, 1937, *R. R. Tatnall,* no. 3574. Virginia: peaty swale (cut-over cypress swamp), about 4 miles northwest of Homeville, Sussex County, September 20, 1937, *Fernald & Long,* no. 7301, as *E. brevibarbis* Michx. (type in Herb. Gray); alluvial woods along Nottoway River, Green Church Bridge, northwest of Owen's Store, Sussex County, October 14, 1941, *Fernald & Long,* no. 13,884. All but the last distributed as *E. brevibarbis.*

Var. **Elliottianus,** var. nov., planta major; culmis ad 2 m. altis ad basin 6–10 mm. diametro; laminis 7–12 mm. latis; panicula laxiore majoreque 2–4.5 dm. longa 4.5–10 cm. diametro, racemis 4–8 cm. longis.—North Carolina to Florida. Type: thicket bordering pond near Live Oak, Florida, October 10, 1901, *A. H. Curtiss,* no. 6940, as *E. alopecuroides,* var. *brevibarbis.*—The plant beautifully described as *E. brevibarbis* by Elliott, Sk. i. 39 (1816) and very crudely illustrated by him.

Erianthus coarctatus and var. *Elliottianus* have passed, ever since Elliott, as *E. brevibarbis* Michx. Nash in North Am. Fl. xvi[1]. 93 (1909) cites for *E. brevibarbis* the "Type locality: Tennessee" and then gives the range "Delaware to Florida, west of Louisiana"; while Hitchcock, Man. 723 (1935) says "Moist places, Coastal Plain, Delaware to Florida and Louisiana", but on p. 854 cites the type as from "Tennessee and Carolina, *Michaux.*" Michaux, in originally describing it, Fl. Bor.-Am. i.

Photo. B. G. Schubert.

MUHLENBERGIA SETOSA (M. GLOMERATA): FIG. 1, type of POLYPOGON GLOMERATUS, × ⅓; FIG. 2, characteristic opaque and puberulent internode and node and base of sheath, × 5, from Pennsylvania.

Photo. B. G. Schubert.

MUHLENBERGIA SETOSA, var. CINNOIDES: FIG. 1, type of DACTYLOGRAMMA CINNOIDES, × 1/3; FIG. 2, panicle, × 1, from Newfoundland; FIG. 3, portion of paniele to show elongate anthers, × 4, from Maine; FIG. 4, floret to show villi running high on lemma, × 10, from Newfoundland; FIG. 5, grain, × 10, from Quebec.

55 (1803), said "*HAB.* in collibus Tennassée et Carolinae". The discrepancy in Michaux's statement (and his label) and the Coastal Plain range of the plant usually taken to be *E. brevibarbis* has often been noted; and when Hitchcock examined the Michaux TYPE he wrote:

> **Erianthus brevibarbis** Michx.
>
> "In collibus desertis ab amnio Wabash ad Ostium Missouri 5 diebus distantibus". The specimen belongs to the species described in Small's Flora under this name. The range as originally published is "in collibus Tennassée et Carolinae". The known range is from Delaware southward along the coast to Florida, and west to Louisiana. We do not know of its occurrence in southern Illinois, as given on Michaux's label.—Hitchc. Contrib. U. S. Nat. Herb. xii[3]. 151 (1908).

Michaux's type, with the label as quoted by Hitchcock, is here reproduced × ½, as PLATE 759, FIG. 1. That it is very unlike the Coastal Plain plant for which it has passed is evident. Its apparently mature and disintegrated panicle is hidden amongst the broad and prolonged leaves and enlargements of the spikelets, FIG. 2, × 1½, show them to be like those of the plant (PLATE 760) of Pulaski County, Arkansas, distributed by Dr. Delzie Demaree (by creek near old quarry, Pulaski Heights, Little Rock, September 23, 1931, *Demaree*, no. 8228). Like that of the Michaux type the panicle (PLATE 760, FIG. 1, × ½) of Demaree's no. 8228 is disintegrating. In equivalent latitudes of the Coastal Plain *E. coarctatus* sheds its fruit from mid-October into November. Since the Demaree plant is so like Michaux's type from well up in the Mississippi Valley we may note that it has 10, instead of only 4–6 nodes; the leaf-blades broader (up to 1.5 cm. wide) and with more numerous veins (the more prominent veins 6–8 each side of the midrib); the mature panicle partly included at base and greatly exceeded by the broad upper blade (2.3 dm. long); the glumes (PLATE 759, FIG. 3, × 6) with glabrous and lustrous surfaces (Michaux said "valvis acutissimis, nudis"); the more abundant beard up to 6 mm. long; and the awn (PLATE 760, FIG. 3, × 3) only 8–10 mm. long, less than twice, instead of nearly thrice the length of the glumes.

The collection in Arkansas of a plant which closely matches the Michaux type and which is so different from the *Erianthus "brevibarbis"* of most authors supports Michaux in his statement on the label. Although the assertion (generally attributed to

Richard who issued the work after the death of Michaux) in the original publication, that it came from hills of Tennessee and from Carolina does not coincide with the original label, there is now clear evidence that a plant like Michaux's does occur in the Mississippi basin. It is not without significance that Hackel, the master of the *Gramineae*, doubted the identity of Michaux's plant with that of Elliott. In his great work on the *Andropogoneae* in DC. Mon. Phan. vi. 131 (1889), treating *E. brevibarbis*, as *E. saccharoides* subsp. *brevibarbis*, he accurately described the newly recognized *E. coarctatus*, var. *Elliottianus*, doubting if he had the Michaux species (transferred by Persoon to *Saccharum*), his citations reading: "Er. brevibarbis Mich. . . . ?, certe Elliott, Sketch . . . et aliorum auctt. amer.; Sacch. brevibarbis Pers. . . . ?" His doubt seems to have been justified; at least, *E. coarctatus* and *E. brevibarbis* seem quite as distinct as do most of our species in the genus. As to the range of the latter, it is yet to be worked out. The botanists of Indiana, Illinois, Tennessee and Missouri seem not to have noted it; and, although Demaree's label bears the memorandum, "New to Ark.", Hackel, l. c. cited as *E. brevibarbis* Arkansas material at Berlin, received from Engelmann. Michaux's label, giving the data, on dry hills 5 days distant from the River Wabash toward the mouth of the Missouri, means that he got it in southern Illinois, presumably between Jefferson County at the east and Randolph County at the west. On August 23, 1795, Michaux, with an Indian, and a horse to carry his baggage, left Vincennes on the Wabash, in Knox County, Indiana, and on the 28th spent the day drying out his water-soaked collections by a camp-fire, reaching Kaskaskia, in Randolph County, Illinois, on the 30th. From late August to October 2 he collected up and down the Mississippi, with Kaskaskia as a base, and then returned to the Ohio. Five days travel from Vincennes, allowing for the stops recorded in Michaux's diary, means that he got *Erianthus brevibarbis* in southwestern Illinois; and it is clear that his overmature material was collected, at latest, in early October. The latter fact and the over-ripe material from Arkansas, collected on September 23, indicate that true *E. brevibarbis*, although little known, is a relatively early species to mature.

In habit and in dense panicle with appressed-ascending

branches, typical *Erianthus coarctatus* strongly suggests *E. strictus* Baldwin; but the panicle of *E. strictus* is more slender and elongate and its spikelets are naked at base or with the merest suggestion of a greatly abbreviated coma at the tips of some pedicels. Furthermore, in eastern Virginia *E. strictus* is the earliest-flowering species of the genus, our 8 collections, from young anthesis to mature fruit ranging in date from July 20 to September 19, with a single one, from wet woods, secured on October 18; the Virginia collections of *E. coarctatus*, both immature, were made on September 20 and on October 14.

Michaux, who established the genus *Erianthus*, did not realize the complexity of the genus. He recognized but two species: his *E. saccharoides*, "a Carolina ad Floridam", with "gluma villis involucrantibus multo breviore", identical with *Anthoxanthum giganteum* Walt. (1788); and *E. brevibarbis*. *E. strictus*, *E. coarctatus* and other species which he must have encountered and collected, were not worked out by him or, presumably, were confused with those of which types are preserved.

Related to *Erianthus brevibarbis* and *E. coarctatus* in having the terete awns projected forward (rather than flattened ones spirally twisted at base and with the straightish tip thrown somewhat to one side) are two plants with thicker panicles and with coma exceeding the glumes: *E. saccharoides* Michaux or *Anthoxanthum giganteum* Walt. = *E. giganteus* (Walt.) F. T. Hubbard and sensu Hitchcock, but certainly not *E. giganteus* Muhl., to whom Hitchcock erroneously ascribes the species; and *E. compactus* Nash. Before considering the differences between these two it is necessary to consider the correct name for the plant which Hitchcock, Man., is calling *E. giganteus*, for it is quite clear that his discussion (Man. p. 854) was based on confused ideas and inaccurate quotation of Muhlenberg's Catalogue. Hitchcock's paragraph is as follows:

> (5) **Erianthus giganteus** (Walt.) Muhl., Cat. Pl. 4. 1813. Based on *Anthoxanthum giganteum* Walt. Later (Descr. Gram. 192. 1817) Muhlenberg uses the name for both *E. saccharoides* [Michx., 1803] and *E. alopecuroides* [L. (Ell.)] (his herbarium specimen under this name including both species), but the description (awn twisted) applies better to *E. alopecuroides*. *Erianthus giganteus* was published as new by Hubbard (Rhodora **14:** 166 (1912) based on *Anthoxanthum giganteum* Walt.

If, as Hitchcock definitely states, the name *Erianthus giganteus* Muhl. Cat. had been based on *Anthoxanthum giganteum* Walt., there was no need of a new combination by Hubbard; but Hubbard in 1912 was following the International Rules of that period and, as he clearly and correctly explained, *E. giganteus* Muhl. Cat. (1813) was NOT based on *Anthoxanthum giganteum* Walt., but was a change of name by Muhlenberg of *Andropogon alopecuroides* L. Since by present-day rules Muhlenberg had no right to give the new specific name, instead of using the one assigned by Linnaeus, Muhlenberg's quite new name, *Erianthus giganteus*, is illegitimate; but, by the "homonym rule", adopted in the International Rules since Hubbard wrote, there is no room for a second *E. giganteus*, based on Walter's name, especially since Walter's species is admittedly identical with *E. saccharoides* Michx. As to Hitchcock's flat statement that Muhl. Cat. (1813) based the name *E. giganteus* upon *Anthoxanthum giganteum* Walt., the following reproductions of Muhlenberg's text indicates that the statement could not have been verified. The first reproduction is from ed. 1 (1813), the second from ed. 2 (1818).

[1] 26. ANTHOXANTHUM, SPRING GRASS,
2. giganteum Walter v. erianthus } gigantic,
27. ERIANTHUS, ERIANTHUS, semen 1.
1. giganteus, ♃ andropogon, alopec. L. } gigantic, Car. Virg.

[2] 27 ANTHOXAN'-THUM } SPRING GRASS semen 1.
2 giganteum, Walter. v. erianthus } gigantic
28 ERIANTHUS ERIANTHUS semen 1.
1 giganteus ♃ *Andropogon alopec.* L. } gigantic Car. Virg.

It is perfectly clear that Muhlenberg was maintaining Walter's *Anthoxanthum giganteum* under *Anthoxanthum!*, though with the rather vague intimation ("v. [vel] erianthus") that it was perhaps an *Erianthus*. He made no combination based directly upon it; but his *Erianthus*, the next genus, consisted of two other species, 1. *giganteus*, a substitute-name for *Andropogon alopec*[*uroides*] L., and 2. *E. brevibarbis* Michx., already discussed. In his Cat.

Photo. B. G. Schubert.

ERIANTHUS COARCTATUS: FIG. 1, type, × 2/5; FIG. 2, panicle, × 1; FIG. 3, summit of rachis of raceme, × 3; FIG. 4, spikelet, × 3; FIG. 5, spikelet, × 6.

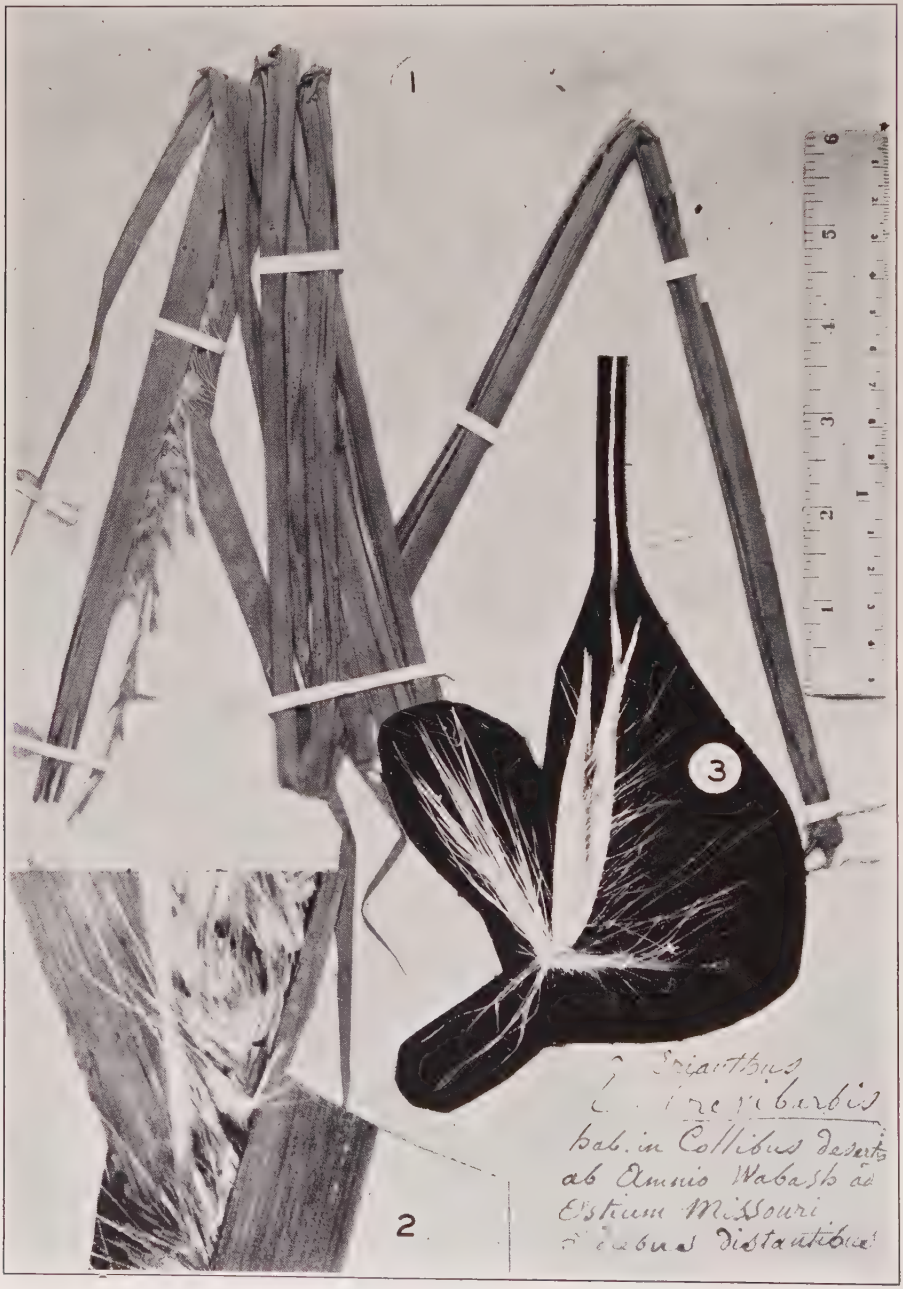


Photo. B. G. Schubert.

ERIANTHUS BREVIBARBIS: FIG. 1, type, × ½; FIG. 2, spikelets of type, × 1½; FIG. 3. spikelet, × 6, from Arkansas.

ed. 2: 4 (1818) Muhlenberg repeated (see quotation above) the treatment of ed. 1, merely making *Andropogon alopecuroides* more emphatically the nomenclatural basis of *E. giganteus* by using italics: "1 giganteus *Andropogon alopec.* L."

There is no question, apparently, about the identity of *Erianthus alopecuroides* (L.) Ell., which was based on *Andropogon alopecuroides* L. Sp. Pl. ii. 1045 (1753), the type being *Clayton*, no. 601 from Virginia. A. photograph of the type, × ½, is reproduced as PLATE 761, FIG. 1, with an enlargement (FIG. 2) of spikelets, × 3, showing the characteristic flattened and twisted awn and the copious long coma. *Erianthus giganteus* Muhl. Cat. (1813), based directly upon it, has nothing to do with *E. giganteus* (Walt.) F. T. Hubbard; and the latter, a valid combination when published, must give way to E. SACCHAROIDES Michx. As to the definition by Muhlenberg of a plant he subsequently called *Erianthus giganteus*, that simply confirms his identification of it with *Andropogon alopecuroides* L., for he emphasized the twisted awn. I cannot follow the reasoning by which *E. giganteus* was taken up by Hitchcock in his Manual as *E. giganteus* "(Walt.) Muhl." In 1908 he was apparently right when he wrote of *Anthoxanthum giganteum* Walt. "The specific name can not be taken up because there is an *Erianthus giganteus* Muhl., based upon *Andropogon alopecuroides* L."—Hitchc. in Contrib. U. S. Nat. Herb. xii[3]. 151 (1908).

Although Nash in N. Am. Fl. xvii[1]. 94 (1909) reduced to *Erianthus saccharoides* Michx. his own *E. compactus* Nash in Bull. Torr. Bot. Cl. xxii. 419 (1895) and although Hitchcock, Man. also reduces it to the ill-fated *E. giganteus*, it seems to me a very well defined variety. Typical *E. saccharoides*, as shown by a photograph of the type before me, has the excessively hairy panicle 2–6 dm. long, the long beard of the spikelet 2 or 3 times as long as the blades of the glumes. It occurs from Florida to Texas, north to southeastern Virginia. Typical *E. compactus* has the panicle only 1–2 dm. long and the beard from slightly longer than to barely twice the length of the blades of the glumes. It occurs from the Carolinas and Alabama northward to southeastern New York, New Jersey, eastern Pennsylvania, the District of Columbia, northern Virginia and Kentucky, in the southern part of its range working back to the Appalachian

Mountains. Throughout the region where it is beyond the range of *E. saccharoides* it is readily recognizable and quite distinct, but a large proportion of specimens before me from South Carolina show a mixture of the two trends (panicles up to 3.5 dm. long but with short coma, the blades of the glumes thus very evident in the panicle as contrasted with the hidden blades in typical *E. saccharoides*) while some specimens from Georgia lie between *E. saccharoides* and *E. compactus;* so that I am forced to consider *E. compactus* an essentially northern and inland variety rather than a true species:

E. SACCHAROIDES Michx., var. **compactus** (Nash), comb. nov. *E. compactus* Nash in Bull. Torr. Bot. Cl. xxii. 419 (1895).

It is, unhappily, necessary to discuss the type of *Andropogon divaricatum* L. Sp. Pl. i. 1045 (1753). This species has been made by Hitchcock and by Nash identical with *A. alopecuroides* L. l. c. (1753) and in 1908 Hitchcock took it up, apparently because of priority on the page, to replace *E. alopecuroides* (L.) Ell. (1816), saying

> **Andropogon divaricatum** L. Sp. Pl. 1045. 1753.
>
> The type specimen is marked "2 divaricatum" and is from Gronovius. As pointed out elsewhere [b] [b Bot. Gaz. **35:** 215. 1903], this is the same as *A. alopecuroides* L., which is an Erianthus. It should be called **Erianthus divaricatus** (L.) instead of *Erianthus alopecuroides* (L.) Ell. Linnaeus also cites a synonym from Gronovius which is based on Clayton no. 600. This is *Sorghastrum linnaeanum* (Hack.) Nash.—Hitchc. in Contrib. U. S. Nat. Herb. xii[3]. 125 (1908).

My faith in the acumen of Linnaeus is such that I do not expect to find him describing identical species twice on the same page, although such accidents did happen. The diagnosis in 1753 of *Andropogon alopecuroides* was "4. ANDROPOGON panicula laxa, aristis tortuosis". That was all except literary citations, which, since Linnaeus had a specimen (our PLATE 761, FIGS. 1 and 2) matching the diagnosis, are wholly secondary. Similarly *A. nutans* L., type of *Sorghastrum nutans* (L.) Nash, had a "panicula nutante" and our familiar *Andropogon virginicum* was described "paniculae spicis conjugatis" &c. All these accounts (except of *Andropogon nutans* L.) are borne out by photographs of the types before me. *Andropogon divaricatum* did not have a panicle. Instead it was clearly defined: "2. ANDROPOGON spica oblonga, floribus lanatis remotis divaricatis: arista flexuosa

nuda"; and the specimen in Linnaeus's Herbarium (PLATE 761, FIGS. 3 and 4) when he prepared his diagnosis, therefore the TYPE, coincides most accurately with the brief but clear account. What it is I do not know. It was misidentified by Linnaeus with a plant of Clayton's from Virginia, "Lagurus humilior, panicula conica laxa nutante culmum terminante", a plant which Hitchcock says is the same as 3. *A. nutans* L. (*Sorghastrum nutans*). It would be most extraordinary if Linnaeus confused specimens of his nos. 2 and 3 and if Gronovius and Clayton before him treated as two different species from Virginia material of only one, *A. nutans*, while they did not recognize the conspicuously different *Sorghastrum Elliottii* (Mohr) Nash, which is frequent in eastern Virginia.

According to Hitchcock's statement in 1908, "Linnaeus also cites a synonym from Gronovius which is based on Clayton no. 600. This is *Sorghastrum linnaeanum* (Hack.) Nash"—Hitchc. in Contrib. U. S. Nat. Herb. xii[3]. 125 (1908); and he subsequently (Man. 951) states that *S. Linnaeanum* (Hack.) Nash, going back to *Sorghum nutans*, subsp. *Linnaeanum* Hackel in Martius, Fl. Bras. ii[3]. 276 (1883), was "misapplied" by Nash "to *S. Elliottii* (Mohr) Nash". Most unfortunately, here, as in so many cases already discussed, error seems to have crept in. Clayton's no. 600, basis of the Gronovian reference given by Linnaeus under *Andropogon divaricatum*, is beautifully preserved material, for a photograph of which (our PLATE 761, FIG. 5) I am indebted to Dr. Ramsbottom. It is, indeed, the best sort of *Sorghastrum Linnaeanum*, i. e. *S. Elliottii;* and my faith in the acuteness of Clayton, Gronovius and Linnaeus is justified. To be sure, Hitchcock reduced *S. Linnaeanum* to *S. nutans* (L.) Nash; but it seems improbable that he could have read Hackel's original diagnosis:

> Panicula laxa, 25 cm. lg., nutans, oblonga, ramulis longioribus apice bispiculatis. Spiculae intense rufae, 6 mm. lg.; gluma prima ad medium parce pilosa, secunda glabra. Arista 23–25 mm. lg., columna subulam aequans, medio interum geniculata.
> *Andropogon nutans L. Spec. ed. 1. II. 1045 (non Mant. II); Ell. Sketch. I. 141.*
> *Sorghum nutans Chapm. l. c.*
> *America borealis: Florida, Georgia — Texas.*

The clear description by Hackel is very close to Hitchcock's

account of *Sorghastrum Elliottii*, with "panicle loose, 15 to 30 cm. long, nodding at apex, the filiform branchlets and pedicels flexuous . . . ; spikelets 6 to 7 mm. long, chestnut-brown at maturity, . . . first glume hirsute or glabrescent on the back; awn 2.5–3.5 cm. long, twice-geniculate". This strongly contrasts with the account of the plant Hitchcock calls *S. nutans*, with "panicle . . . yellowish, rather dense, contracted . . . at maturity . . . ; awn 1–1.5 cm. long, once-geniculate".

Returning to the actual *Andropogon divaricatum* L., the simple fact remains that its TYPE does not have a panicle. The photograph of it, kindly sent me by Mr. S. Savage (our PLATE 761, FIGS. 3 and 4), shows the summit of a culm with an oblong spike, the spikelets lanate, remote and divergent, the flexuous awn naked (spica oblonga, floribus lanatis remotis divaricatis: arista flexuosa nuda—*Linnaeus*). That it is not *Erianthus alopecuroides* (our PLATE 761, FIGS. 1 and 2) or any member of that genus is obvious. I have tried in vain to place it with anything Virginian or eastern American. The truncated pedicels of some of the spikelets suggest *Andropogon*, as does the spiraling awn; but no *Andropogon* which I know. It is not impossible that its source was far from Virginia. The photograph, poor as it is and showing the spikelets heavily impregnated with glue, may lead to its proper identification. It should be noted that the long-exserted peduncle is quite naked, with a prolonged and divergent blade at base. All eastern American species of *Andropogon* which have to be considered have close sheaths with appressed-ascending tips extending nearly or quite to the inflorescence. It should further be noted that one spikelet (FIG. 4) bears 2 or 3 spiraling awns, suggestive of *Danthonia*, but not of that genus. It is hoped that those who know the grasses will clarify the identity.

As to the type of *Andropogon nutans* L. I have no satisfactory information. The panicle of the wide-ranging species with short awns and pale spikelets is not nodding (*nutans*); but there is no doubt that the plants of Elliott, basis of *S. Elliottii*, and of Chapman were the latter very definite species. Since the identities of types throughout the group have been so discouragingly misunderstood, it is not at all improbable that the type of *A.*

Photo. B. G. Schubert.

ERIANTHUS BREVIBARBIS: FIG. 1, plant, × ½, from Arkansas; FIG. 2, summit of rachis of raceme, × 3; FIG. 3, spikelet, × 3.

Photo. B. G. Schubert.

ERIANTHUS ALOPECUROIDES: FIG. 1, type of ANDROPOGON ALOPECUROIDES, × ½; FIG. 2, tip of same, × 3.

ANDROPOGON DIVARICATUM: FIG. 3, type, × ⅗; FIG. 4, portion of same, × 2; FIG. 5, paratype, *Clayton*, no. 600, × ½.

nutans, when critically compared, may lead to some alterations of our ideas. At least, it is probable that somewhere amongst the many names placed by Hitchcock in the reputed synonymy of his *S. nutans* others may be found earlier than *Chrysopogon Elliottii* Mohr (1897).

From the situation in *Erianthus* and in *Muhlenbergia* (see pt. I) it is evident that the TYPES of our eastern North American grasses need much further and closer study.

PLATE 758. ERIANTHUS COARCTATUS Fern.: FIG. 1, TYPE, × ⅔; FIG. 2, panicle, × 1; FIG. 3, summit of rachis of raceme, × 3; FIG. 4, spikelet, × 3; FIG. 5, spikelet, × 6.

PLATE 759. E. BREVIBARBIS Michx., kindness of Professor *Humbert:* FIG. 1, TYPE, × ½; FIG. 2, spikelets of TYPE, × 1½; FIG. 3, spikelet, × 6, from *Demaree*, no. 8228.

PLATE 760. E. BREVIBARBIS Michx.: FIG. 1, plant, × ½, from Pulaski County, Arkansas, *Demaree*, no. 8228; FIG. 2, summit of rachis of raceme, × 3, from no. 8228; FIG. 3, spikelet, × 3, from no. 8228.

PLATE 761. FIG. 1, TYPE of ANDROPOGON ALOPECUROIDES L. and of ERIANTHUS ALOPECUROIDES (L.) Ell., × ½, kindness of Dr. *John Ramsbottom;* FIG. 2, spikelets of same, × 3, to show twisted awns. FIG. 3, TYPE of ANDROPOGON DIVARICATUM L. and of ERIANTHUS DIVARICATUS (L.) Hitchc., × ⅗, kindness of Mr. *S. Savage;* FIG. 4, summit of inflorescence, × 2. FIG. 5, *Clayton*, no. 600, paratype of A. DIVARICATUM, i. e. SORGHASTRUM ELLIOTTII (Mohr) Nash, × ½, kindness of Dr. *Ramsbottom.*

IV. WHY NOT ANDROPOGON GERARDI?

As early as 1700 the common plant of eastern North America, known either as *Andropogon provincialis* Lam. Encycl. i. 376 (1785) or as *A. furcatus* Muhl. ex Willd. Sp. Pl. iv. 919 (1806), was cultivated and perhaps escaped in Provence, in southern France. Tournefort, Inst. i. 521 (1700) had it as his *Gramen dactylon*, villosum, ramosum, altissimum, Gallo-Provinciale; but it was not until 1761 that the cultivated plant of Provence was beautifully described and illustrated by a figure as *Andropogon spica digitatis, flosculis alternatim geminis, hermaphrodito aristato, sessili; masculo mutico, pedunculato* by Gérard in his Flora Gallo-Provincialis, 106 (fig. 4) and 107 (1761), a plant which grew in southern Provence (*Oritur in gallopr. australi.* Perenne). Gérard's description was so detailed and so lucid that it is here given in full:

Des. *Radix numerosâ fibrarum multifariam implicatarum prole luxurians. Culmi tripedales & ultrà, glabri, striati. Folia radicalia multa, lata, glabra, cespites constituentia; caulina quinque vel sex, admodùm vaginantia, inferne ad margines pilis raris vestita. Membrana ex apice vaginarum*

brevis, lacinulata, sub villosa. Spicae ex apice culmi plures, digitatae, inaequales. Flosculi ex quolibet pedunculi dente gemini, basi villosi; hermaphroditus sessilis, triangularis, calyce unifloro, bivalvi, valvulis aequalibus, corollâ longioribus, exteriori muticâ longiore, interiori breviore, bifidâ, aristatâ, aristâ ex apice divarications prodeunte, recurvâ, flosculo longiore. Filamenta tria, breviora, antherae croceae, nutantes, styli duo, stigmata plumosa, purpurascentia; semen ovatum. Masculus pedicellatus, pedicello plumoso, anguloso; glumâ calycinâ exterior, interiori paulò longior, corollae glumae inaequales, muticae, calyce breviores. Filamenta ut in hermaphrodito, pistillum abortiens.

Obs. *Variat calycibus glabris, & villosis.*

In his Encyclopédie méthodique, i. 376 (August, 1785) Lamarck published it as *Andropogon provinciale* from the Royal Garden at Paris, merely copying the diagnoses of Gérard and of Tournefort, and adding, in French, a brief interpretation, ending: "On trouve cette plante dans la Provence, & on la cultive au Jardin du Roi." Seven years later the plant of Gérard received another binomial, *A. Gerardi* Vitman, Summa Pl. vi. 16 (1792), Vitman copying Gérard's diagnosis and citing both that and the illustration, the plant occurring "*In Gallo provincia*". Then in 1806 the wide-ranging North American plant appeared as *A. furcatus* Muhl. ex Willd. Sp. Pl. iv. 919 (1806). That *A. provincialis* Lam. is the same species as *A. furcatus* Muhl. there seems no doubt. Franchet in Bull. Soc. Bot. France, xxxi. 350–352 (1884) gave a very detailed history of the plant in France and he concluded the study: "La plante figurée et décrite par Gérard et cultivée au Jardin du Roi dès 1763, plante qui est certainement le type de l'*A. provincialis* Lamk, comme en font foi les exemplaires desséchés à cette époque et qui se trouvent dans l'herbier du Museum, est une espèce américaine, nommée quarante-deux ans plus tard *A. furcatus* Muehl. in Willd. *Sp.* IV, 919 (1805 [1806]). L'*A. provincialis* doît donc être rayé de la flore française." That it has, consequently, been "struck out from the French flora" is indicated by Rouy, Fl. Fr. xiv. 21 (1913), where he states in a note that "l'**A. Provincialis** Lamk . . . = *A. furcatus* Mühlenb. . . . qui n'a existé en France que naturalisée et cultivée." Hackel, in his great and comprehensive monograph of the *Andropogoneae* in DC. Mon. Phan. vi. 441 (1889), had no doubt about the matter, definitely citing in the synonymy of *A. provincialis* both *A. Gerardi* and *A. furcatus*.

As it proves, unfortunately, the name *Andropogon provincialis* Lam. (1785), the name used by Hackel, by Nash in N. Am. Fl. and by many others, is clearly antedated by another *A. provincialis* Retz. Obs. Bot. iii. 43 (1783), a low annual, with 15 or 16 fascicled spikes, unequal subulate glumes, etc., obviously not Lamarck's species.[1] There is, however, little support for Hitchcock's doubt as to the identity of *A. provincialis* nor for his perplexity in settling which was earlier, Retz., l. c. or Lam. l. c. Hitchcock's statement is as follows:

> The name *Andropogon provincialis* Lam. (Encycl. i. 376. 1783), was applied to this species by Hackel (in DC., Monogr. Phan. 6: 441. 1889) and others, but Lamarck's species is uncertain. He states that he saw a plant in the Paris Botanical Garden, but his description is taken from Gerard (Fl. Gall. Prov. 107. pl. 4. 1761) and does not well apply to our species. Furthermore, *A. provincialis* Retz. (Obs. Bot. 3: 43. [31]. 1783), which appears to be a species of *Chloris*, was published the same year. The author is unable to determine which is the earlier. The part of Lamarck's Encyclodedie containing page 376 appeared in August 1783.—Hitchc. Man. 790 (1935).[2]

Hitchcock does not state *why* Gérard's "description . . . does not well apply to our species." Franchet and Hackel, both accurate students of grasses, felt positive of the identity; and perusal of Gérard's description side by side with Hitchcock's (Man.) shows nothing specifically distinctive. Any one can readily make the comparison. He is likely to arrive at the conclusion of Franchet, Hackel, Ascherson & Graebner, Rouy and others. As to Hitchcock's inability "to determine which is the earlier [Retz. Obs. Bot. iii. or Lam. Encycl. i. 376]", he was apparently relying on his own conclusion that "The part of Lamarck's Encyclopedie containing page 376 appeared in August 1783". It is too bad that the latter error in date confused the question for, as indicated by Sherborn and Woodward in Journ. Bot. xliv. 319 (1906), the part including p. 376 was published in August, 1785 (not 1783).

[1] Hackel (1889) placed it in *Chloris*.

[2] Hitchcock's inference that the plant, formerly cultivated in France, is "not . . . our species" may have arisen form Hackel's treating it as subvar. *genuinus*, with "spiculae . . . pedicellatae basi fasciculo pilorum manifesto 1,5 mm. longo barbatae" while his subvar. *furcatus* was "ut precedens, sed spiculae pedicellatae basi glabrae v. obsolete barbulatae." It is a very exceptional plant of eastern North America which lacks the bearding at the base of the pedicelled spikelet or at the summit of the pedicel. The distinctive point stated by Hackel is of no importance.

Since *Andropogon Gerardi* Vitman (1792) is the same as *A. provincialis* Lam. (1785) and *A. furcatus* Muhl. (1806), that appears to be the proper name for our common species. The following are the most marked varieties:

A. Gerardi Vitman, var. **paucipilus** (Nash), comb. nov. *A. paucipilus* Nash in Britt. Man. 70 (1901). *A. provincialis* Lam., var. *paucipilus* (Nash) Fern. & Grisc. in Rhodora, xxxvii. 147 (1935).

A. Gerardi, var. **chrysocomus** (Nash), comb. nov. *A. chrysocomus* Nash, l. c. (1901). *A. provincialis*, var. *chrysocomus* (Nash) Fern. & Grisc. l. c. (1935).

(*To be continued*)

A NEW STREPTANTHUS FROM THE BIG BEND OF TEXAS

V. L. Cory[1]

This unique Streptanthus was first collected on February 28, 1937, by Mr. Hugh Cutler, and the collection bears his number 677. This collection is designated the type specimen, and it is deposited at the Gray Herbarium. From a study of this specimen the writer drafted a tentative description and gave it a tentative unpublished name. Although the botanists who have seen this material agree that it is a species of Streptanthus, it seemed better not to publish the description until the plant could be taken in fruit. The writer was unable to visit the locality of growth of this plant at the time for taking it in fruit, but Dr. Hugh Cutler has been more fortunate in this respect, for on May 3, 1941, he visited the exact locality (the point where the old wagon road enters Maravillas Canyon at four miles from Black Gap) and found the plant growing in abundance and in fruit. In addition to sending me this desired material Dr. Cutler also sent some to the Gray Herbarium. The material he sent me was not numbered, so it has been assigned my number, 37078. The circumstances clearly justify naming this species in honor of its discoverer, and I take pleasure in withdrawing the name originally proposed and in making the proper substitution.

[1] Acting Chief, Division of Botany, Texas Agr. Expt. Station, A. and M. College of Texas.

STREPTANTHUS **Cutleri,** n. sp. Plant annual, 35–50 cm. high, glabrous throughout; stems terete, simple at base, usually branched above, 2 mm. in diameter or less; basal leaves 5–10, oblanceolate, petioled, runcinate-pinnatifid, 5–10 cm. long, up to 2 cm. broad, becoming purplish, terminal lobe broad with about 3 sinuses extending halfway to the midrib, the apex broadly triangular; cauline leaves ascending, as long as or longer than the basal leaves, with narrower segments, the terminal segment lanceolate to linear-lanceolate, usually entire except towards base; the upper cauline leaves linear, entire, or undulate to few-toothed basally; petioles scarcely differentiated from the blades, purplish, narrowly winged, dilated at base, 3-nerved, not clasping; petals 4, clawed, 2 developing ampliate blades, 2 represented by the claws only, the developed petals about 25 mm. long, the claws ¾ and the blades ⅖ of the total length; claws of petals 10 mm. long, up to 2 mm. broad, greenish below, pale above, in the undeveloped petals crisped or toothed above; blades of petals 10–14 mm. long, 5–6 mm. broad, ovate, erose or crisped, pale purplish, prominently pinnately nerved with darker purple branching veins; calyx campanulate, somewhat saccate, not carinate; sepals 5, oblong, purple, 10–12 mm. long, thin and scarious to greenish for as much as 2 mm. at the obtuse tips; anthers linear, sagittate; pods very flat, 3.5–6 cm. long, 4 mm. broad, glabrous, ascending, the peduncles 10–18 mm. long, each cell usually 8-seeded or more; seeds orbicular, light brown, broadly winged, the body and wing 4 mm. broad, the body 2 mm. broad.

STREPTANTHUS **Cutleri,** sp. nov. Planta annua, 35–50 cm. alta, tota glabra; caulibus teretibus, basi simplicibus, supra plerumque ramosis, 2 mm. crassis vel minoribus; foliis basalibus 5–10, oblanceolatis, petiolatis, pinnatifido-runcinatis, 5–10 cm. longis, ad 2 cm. latis, purpurascentibus, lobo terminali lato sinubus ad mediam costam, apice late triangulari; foliis caulinis adscendentibus foliorum basalium longitudinem aequantibus vel excedentibus, lobis angustis, terminali lanceolato vel linearilanceolato, saepius basi excepta integro; foliis caulinis superioribus linearibus, integris vel repandis vel parcius deorsum dentatis; petiolis vix a lamina distinctis, purpureis, anguste alatis, basi dilatatis, 3-nerviis haud amplectentibus; petalis 4, clavatis quorum 2 in laminas amplas abeuntibus, 2 unguicularibus tantum, petalis evolutis ca. 25 mm. longis, unguibus ¾ laminae ⅖ longitudinis totius; unguibus 10 mm. longis, ad 2 mm. latis, subtus viridescentibus, supra pallidis, petalorum haud evolutorum apice crispis vel dentatis; laminis 10–14 mm. longis, 5–6 mm. latis, ovatis, crispis vel erosis, pallide purpureis, evidenter pinnatinervis, venulis ramosis obscure purpureis; calyce campanulato subsaccato haud carinato; sepalis 5, oblongis, purpureis, 10–12 mm. longis, apice ca. 2 mm. tenuibus scariosis vel virides-

centibus; antheris linearibus, sagittatis; leguminibus valde compressis, 3.5–6 cm. longis, 4 mm. latis, glabris, adscendentibus, pedunculis 10–18 mm. longis, cella quave saepius seminibus 8 vel ultra donata; seminibus orbicularibus, pallide brunneis, late alatis, totis 4 mm., parte centrali 2 mm. latis.[1]

The type locality of this species is in Maravillas Canyon of Brewster County, Texas, about fifty miles south of Marathon and four miles northeast of Black Gap, at an elevation of 2500 feet. This species is distinct in that only 2 petals develop ampliate blades. It differs from other species of West Texas in that its leaves are not clasping. Of these species its closest relationship seem to be with *S. platycarpus* A. Gray.

THE VARIATIONS OF BRACHYELYTRUM ERECTUM

William K. Babel

In eastern North America, *Brachyelytrum erectum* (Schreb.) Beauv. exhibits two well-defined geographic tendencies; the northern plants are characterized by having glabrous or scabrous lemmas, while the southern plants have strongly hispid lemmas. These variations may be distinguished as follows:

Lemmas strongly hispid, the hairs 0.2 to 0.6 mm. long . . *B. erectum* (typical).
Lemmas glabrous or scabrous, with hairs 0.02 to 0.15 mm. long or less . . . . . *B. erectum* var. *septentrionale*.

Brachyelytrum erectum (Schreb.) Beauv., Ess. Agrost. 155 (1812). *Muhlenbergia erecta* Schreb. in Spreng., Mém. Acad. St. Pétersb. **2:** 287 (1807–08). ? *Dilepyrum aristosum* Michx., Fl. Bor.-Amer. **1:** 40 (1803). *Brachyelytrum aristatum* (Pers.) Roem & Schult. var. *Engelmanni* A. Gray, Gray's Man. ed. 5. 614 (1867). *Brachyelytrum aristosum* (Michx.) Trel. var. *glabratum* Vasey in Millsp., West Va. Agri. Expt. Sta. Bull. **24:** 469 (1892). *Dilepyrum erectum* (Schreb.) Farwell, Amer. Midl. Nat. **8:** 33 (1922).—Massachusetts south to Georgia, west to Louisiana and southern Wisconsin. Hitchcock states that the type of *Muhlenbergia erecta* Schreb. was collected in Georgia and Carolina.[2] The southern plants may therefore be considered the typical variety.

B. erectum (Schreb.) Beauv., var. **septentrionale** var. nov., lemmatibus glabris vel scaberulis. Growing in rich soil in open

[1] I am indebted to Dr. Leon Croizat for aid in the preparation of the Latin description.

[2] Hitchcock A. S. Man. Grass. U. S., 810 (1935).

woods near Horticultural Farm, Durham, Strafford County, New Hampshire, June 19, 1942, *Babel* no. 46 (TYPE in the University of Wisconsin Herbarium).—Newfoundland to Connecticut and New Jersey, and west to northern Wisconsin, following the mountains south to West Virginia.

The type of *Brachyelytrum aristosum* var. *glabratum* Vasey has hispid lemmas and so belongs to the typical variety. It was separated from the species by Vasey on the basis of its glabrous blades and sheaths, but the glabrous blades and sheaths are found in the northern variety as well as the southern. Such specimens have been seen from North Carolina (typical), West Virginia (typical), and northern Maine (var. *septentrionale*). Since the glabrous plants are found in both varieties, it seems better not to consider them as another distinct variety.

Under *Brachyelytrum aristatum* (Pers.) Roem. & Schult., Gray named a var. *Engelmanni*. This was originally described as "a Western form, with upper glume awn-pointed, nearly half the length of the palet."[1] Through the kindness of Professor Fernald, I have been able to examine a specimen from St. Louis, Missouri, labeled var. *Engelmanni* in Gray's own handwriting, and which may, therefore, be considered as representing Gray's conception of this variety. The spikelets have long-awned second glumes, half the length of the palea, thus fitting Gray's description. Upon examining a large series of specimens, however, it becomes apparent that this variation is not confined to the western part of the range, but rather is found occurring sporadically throughout the range of the species. Individuals of both varieties here recognized show this character. A large number of plants exhibit both long-awned and awnless second glumes on different spikelets of the same plant. It does not seem advisable to maintain var. *Engelmanni* as originally defined by Gray, even as a form.[2] The specimen has strongly hispid lemmas and, therefore, belongs with the typical variety.

I am deeply indebted to Dr. Earl Core of the University of West Virginia for his kind loan of specimens; to Mrs. Agnes

[1] Gray Man. ed. 5. 614 (1867).

[2] It is possible to interpret the present International Rules as requiring that the name var. *Engelmanni* be retained for the typical variety since Gray's plant is typical *B. erectum* as here defined. This does not seem to be a wise course to follow, for in so doing, I must designate Gray's sheet as "type" of var. *Engelmanni*. There would then be two types, one for var. *Engelmanni* and the other for *Muhlenbergia erecta* Schreb.

Chase of the Smithsonian Institution for information concerning the location of the type of var. *glabratum;* to Professor M. L. Fernald of the Gray Herbarium for his kind loan of specimens; to Mr. F. W. Hunnewell of the New England Botanical Club for his loan of herbarium material; to Mr. Orr Goodson of the Field Museum for his kindness in loaning me herbarium material including the type of var. *glabratum.*

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THE IDENTITY OF ASTER SALSUGINOSUS RICHARDSON

Arthur Cronquist

On page 748, Appendix 7 (first edition), of Franklin's "Narrative of a Journey to the Shores of the Polar Sea", Richardson described *Aster salsuginosus* as follows:

323. A. salsuginosus: caule unifloro, foliis lineari-obovatis acutis subintegerrimis venosis, calycibus laxe imbricatis linearibus acutis disco vix duplo radio plus triplo brevioribus. (W)[1]

Herbaceus. *Caules* plures ex eadem radice, dodrantales erecti aut ascendentes firmi simplices purpurei sed pilis brevissimis sub-incanis. *Folia* sessilia lineari-obovata lanceolatave plerumque acuta, integerrima vel ad apicem dentibus raris munita, venosa, utrinque concolora, supra glabra, subtus pilis brevibus patentissimis vestita. *Flos* magnus terminalis infra quem caulis paulo incrassatus est et villosus. *Calyx* laxiusculus pilis brevibus canis obtectus, laciniis linearibus acutis, marginibus purpurascentibus. *Flosculi disci* calyce fere duplo longiores: *radii* triginti sesqui-unguiculares disco duplo longiores, lineares sub-emarginati. *Germina* hirta pappo simplici dentato fuscuscente discum aequante coronata.

Hab. On the Salt Plains in the Athabasca.

A few years after Richardson's publication, Drummond returned from a trip to the Rocky Mountains, bringing specimens which Hooker identified as *A. salsuginosus.* Seeds which Drummond brought back were planted in gardens, and the garden plants were used for an excellent illustration in Curtis' Botanical Magazine (**16:** pl. 2942. 1829). Since that time, nearly all botanists, including Asa Gray as indicated by his treatments in

[1] As stated on page 730, W "denotes the wooded country from latitude 54 degrees to 64 degrees north."

the Synoptical Flora and elsewhere, seem to have accepted the Drummond specimens as typifying *Aster salsuginosus.*

In 1912 Dr. E. L. Greene[2] pointed out that *A. salsuginosus* Richardson (which by that time had been transferred to *Erigeron*) was not the same as the Rocky Mountain plant which commonly passed as *Erigeron salsuginosus* (Rich.) Gray. Without indicating the exact differences between it and *A. salsuginosus,* Greene proposed the name *E. callianthemus* for the Rocky Mountain plant. His proposal was not widely adopted.

In my work on the North American species of *Erigeron,* I was faced with the problem of the type of *A. salsuginosus.* It at once appeared that Richardson's description could not apply to the Rocky Mountain plant, which latter has distinctly glandular instead of white-hairy involucres, and has the leaves ordinarily essentially glabrous, certainly not "*supra glabra, subtus pilis brevibus patentissimis vestita.*"

A specimen of Richardson's original collection has been located at the Gray Herbarium, and through the kindness of Dr. M. L. Fernald has been made available to me for study. The label reads, in a bold hand which Dr. E. C. Abbe informs me is Richardson's, "323 Aster salsuginosus". Also on the label, in a hand which has not been identified, is the notation, "Richardson's Arctic Plants". The sheet bears two printed labels, which read, "Herb. John A. Lowell", and "Transferred from the Boston Society of Natural History to the Gray Herbarium of Harvard University, October 2, 1941". The number 323 on the label coincides with the number of the species in the first edition of Richardson's Appendix, and the plant matches the original description. There seems to be no room for doubt that it is one of the original Richardson specimens.

The plant is a form of the species which is now commonly called *A. Richardsonii* Spreng. It is larger than usual *A. Richardsonii,* approaching *A. Richardsonii* var. *meritus* (A. Nels.) Raup, but is clearly and unmistakably within the limits of variation of the species.

A. Richardsonii Spreng. was based on *A. montanus* Rich., which was the next species after *A. salsuginosus* in Richardson's appendix. (*A. montanus* Rich. was antedated by *A. montanus*

[2] E. L. Greene, *Some Erigeron Segregates,* Leafl. 2: 193–218 (1912).

Nutt., and thus untenable.) *A. salsuginosus* thus has obvious priority over *A. Richardsonii.*

I refrain from transferring *A. Richardsonii* var. *meritus* because I am not certain that *A. salsuginosus* is specifically distinct from *A. sibiricus* L. The two are evidently closely related, and an adequate decision can be reached only after study of a considerable series of specimens of each, in which I do not wish to involve myself at present.

The Rocky Mountain plant that has been confused with *A. salsuginosus* appears to be a subspecies of *Erigeron peregrinus* (Pursh) Greene. It may now be known as

E. PEREGRINUS (Pursh) Greene subsp. **callianthemus** (Greene), stat. nov. *E. callianthemus* Greene, Leafl. **2:** 197, 1912.

This subspecies and its varieties will be more fully treated in my revision of the North American Erigerons.

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